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Forest Service

Pacific
Northwest
Region



April 2014



Bailey, Aeneas, Revis and Tunk Livestock Grazing Analysis

Draft Environmental Impact Statement

Summary

Tonasket Ranger District
Okanogan-Wenatchee National Forests
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Lost Creek

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File Code: 1950/2200

Date: March 31, 2014

Dear Planning Participants,

I am pleased to announce the completion of the Draft Environmental Impact Statement for the Bailey, Aeneas, Revis, and Tunk C & H Livestock Grazing Analysis (BART). You previously requested a copy of this document in one of the five following formats: CD of the entire document, CD of the Summary only, a paper copy of the entire document, a paper copy of the Summary only, or you indicated that you could view the document on the web. Enclosed is the version that you requested. If you have not previously indicated a preference, we are mailing you a CD of the Summary only. Hard copies of the document will also be available for review in the Forest Service Offices in Tonasket (1 West Winesap), Wenatchee (215 Melody Lane), and in Okanogan (1240 South 2nd Avenue), Washington.

This letter also serves as notification of the availability of the Draft Environmental Impact Statement and some supporting documents on our website to those who requested to view the document on the internet. These documents are now available on our website at:

http://www.fs.fed.us/nepa/nepa_project_exp.php?project=38873

We began our scoping for the Bailey, Aeneas, Revis, and Tunk C&H Livestock Grazing Analysis in May 2012 with a call for comments. Since that time, the BART Grazing Analysis has transitioned from an Environmental Assessment (EA) to an Environmental Impact Statement (EIS) because public comments and internal discussions determined that the proposal may have adverse impacts on stream sedimentation rates. On November 23, 2012, a Notice of Intent was published in the Federal Register to change the analysis from an Environmental Assessment to an Environmental Impact Statement. On November 26 and 27, 2012 scoping letters were sent to approximately 160 entities.

We did receive many helpful and insightful comments for the project.

Change in the Administrative Appeal Process to a Pre-Decisional Objection Process

On March 27, 2013 the Final Rule for Project Level Pre-decisional Review Process (36 CFR 218) was published in the Federal Register and replaced the 36 CFR 215 administrative appeal process. The new rule expanded the pre-decisional objection process used for projects authorized under the Healthy Forests Restoration Act of 2003. The new rule provides the public an opportunity to comment and express concerns on a project before decisions are made, rather than after. The Forest Service believes this aligns with our collaborative approach to forest management and increases the likelihood of resolving those concerns, resulting in better, more informed decisions.



The new rule provides the public an opportunity to seek higher level review of unresolved concerns before the project decision has been signed, rather than having to appeal a signed decision. Individuals and entities who submit specific written comments during a public comment period established by the responsible official will be eligible to object. This includes those who previously submitted comments during this project's scoping period (36 CFR 218.2).

How to Comment and Timeframe: Written, facsimile, hand-delivered, oral, and electronic comments concerning this action will be accepted for 45 days following the publication of the Notice of Availability in the Federal Register. A legal notice will also be published in The Wenatchee World, the newspaper of record for this project. The publication date in the Federal Register is the exclusive means for calculating the comment period for this proposal. Those wishing to comment should not rely upon dates or timeframe information provided by any other source. Regulations prohibit extending the length of the comment period.

Individuals and entities who submit specific written comments at this stage will be eligible to object. Issues raised in objections must be based on previously submitted specific comments to the proposed project or activity unless the objection concerns an issue that arose after the opportunities for comment. Comments received during this review period for the EIS will be considered, and a revised (if necessary) EIS and draft Record of Decision will be released for a 45 day review and objection period (36 CFR 218, Federal Register, Volume 78, No. 59, March 27, 2013).

Written comments must be submitted to the Responsible Official, Forest Supervisor Michael L. Balboni, c/o Phil Christy, 1 West Winesap, Tonasket, WA 98855. Phone: (509) 486-5137; FAX: (509) 486-1922. The office business hours for those submitting hand-delivered comments are: 7:45 A.M. to 4:30 P.M., Monday through Friday, excluding holidays.

Those submitting electronic comments must put the project name in the subject line, and either submit comments as part of the e-mail message or as an attachment in one of the following three formats: Microsoft Word, rich text format (rtf) or Adobe Portable Document Format (pdf), and must do so only to the following e-mail address: comments-pacificnorthwest-okanogan-tonasket@fs.fed.us. In cases where no identifiable name is attached to a comment, a verification of identity will be required for objection eligibility. If using an electronic message, a scanned signature is one way to provide verification. E-mails submitted to e-mail addresses other than the one listed above, in other formats than those listed, or containing viruses, will be rejected.

It is the responsibility of persons providing comments to submit them by the close of the comment period. It is the responsibility of persons providing comments by electronic means to ensure that their comments have been received. Individuals and organizations wishing to be eligible to object must meet the information requirements of 36 CFR 218.

Please be aware that all comments, names, addresses, and phone numbers become part of the project record and are subject to release if a Freedom of Information Act (FOIA) request is received.

If you wish to review the project file or obtain additional information on the project please contact Phil Christy at (509) 486-5137.

I wish to thank you for your helpful and extensive comments as we continue with the environmental analysis to its conclusion.

Sincerely,

Dale Olson
Tonasket District Ranger

Bailey, Aeneas, Revis and Tunk C&H Livestock Grazing Analysis

Draft Environmental Impact Statement

Summary

Okanogan County, Washington
April 2014

Lead Agency USDA Forest Service
 Okanogan – Wenatchee National Forest

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Abstract This Draft Environmental Impact Statement (DEIS) documents the detailed analysis of three alternatives for the management of the Bailey, Aeneas, Revis, and Tunk Cattle and Horse (BART) Grazing Allotments. The BART Grazing Allotments analysis area is located approximately ten miles southeast of Tonasket, Washington. Alternatives include Alternative 1, no grazing, Alternative 2, the proposed action and Alternative 3, current grazing with fencing and rested units. The preferred Alternative is Alternative 2 which would authorize livestock grazing consistent with Forest Plan standards and guidelines while implementing specific resource improvement measures.

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BART Grazing Analysis

Draft Environmental Impact Statement

Summary

Introduction

The Tonasket Ranger District proposes to authorize the continuation of cattle grazing within the Bannan, Aeneas, Revis, and Tunk Cattle and Horse Grazing Allotments (herein referred to as BART Grazing Allotments) in compliance with the National Environmental Policy Act (NEPA) and other relevant laws and regulations. This summary explains the purpose and need for action, the decision framework, and applicable mitigation and monitoring requirements. It describes the proposed alternatives, public involvement, and issues/concerns that were identified during public scoping and by the Interdisciplinary Team and it provides a comparison of alternatives and how each addresses the issues.

The Forest Service developed three alternatives: the No Grazing Alternative, the Proposed Action, and an additional action alternative, in response to public comment (scoping) and grazing permittee issues.

This project will implement a land management plan and is not authorized under the Healthy Forest Restoration Act and is thus subject to the objection process at 36 CFR 218, Subparts A and B.

Analysis Area

The analysis area includes about 36,297 acres of National Forest System lands within Township (T.) 35 North (N.), Range (R.) 28 & 29 East (E.), and T. 36 N., R. 28, 29 & 30 E., Willamette Meridian (W.M.). See Figure S-1 for a Vicinity Map of the BART Grazing Analysis Area. See Figure S-2 for a map of the BART Analysis Area. All maps, except Figures S-1 and S-2, are at the end of the Summary since they are printed on 11 X 17 paper for easier viewing.

This land is managed by Tonasket Ranger District, Okanogan-Wenatchee National Forest, Okanogan County, Washington. The southern portion of the analysis area borders lands managed by the Confederated Tribes of the Colville Indian Reservation (CCT). Private lands and lands managed by Washington State Department of Natural Resources (DNR) border the north and west boundaries. Landmark locations include, Bannan Mountain; Tunk Mountain; Crawfish Lake; Aeneas, Barnell, Lost, Cole, Bench, Peony, Chewiliken, and Jungle Creeks; and Barnell Meadows. Aeneas, Barnell, and Lost Creeks are the three major fish bearing streams in the analysis area. Primary access to the BART allotments is by Forest System Roads (FSR) 3000, 3010, and 3015 and Haden Creek County Road (OCR 3789). Approximately 13,698 acres lie within the Bonaparte Creek-Okanogan River Watershed and 22,599 acres lie within the West Fork Sanpoil River Watershed. Watershed Assessments were completed for these two watersheds in 1998 (USDA Forest Service 1998a & 1998b).

**Figure S-1, BART Grazing Analysis
Vicinity Map**

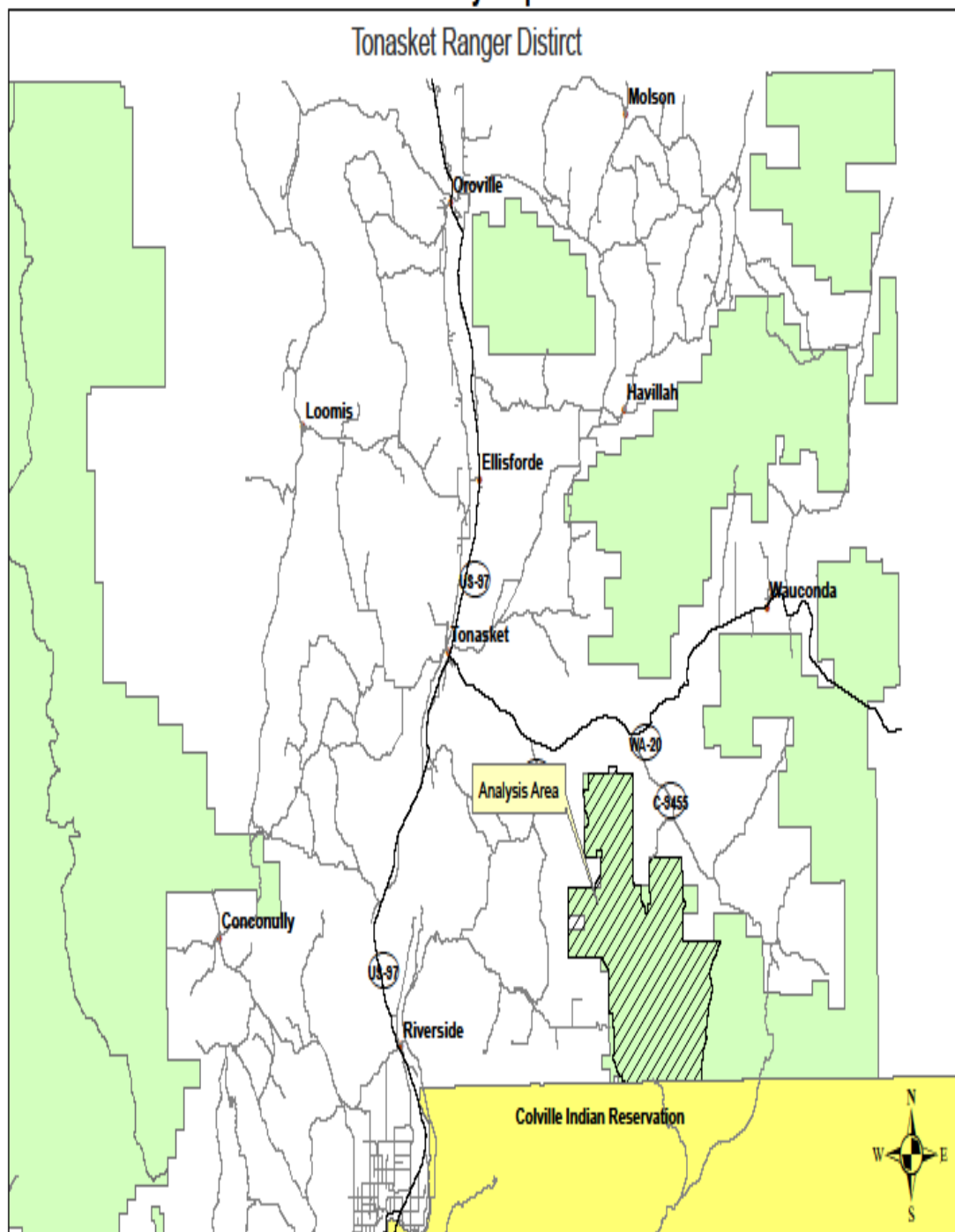


Figure S-1, BART Grazing Analysis Vicinity Map

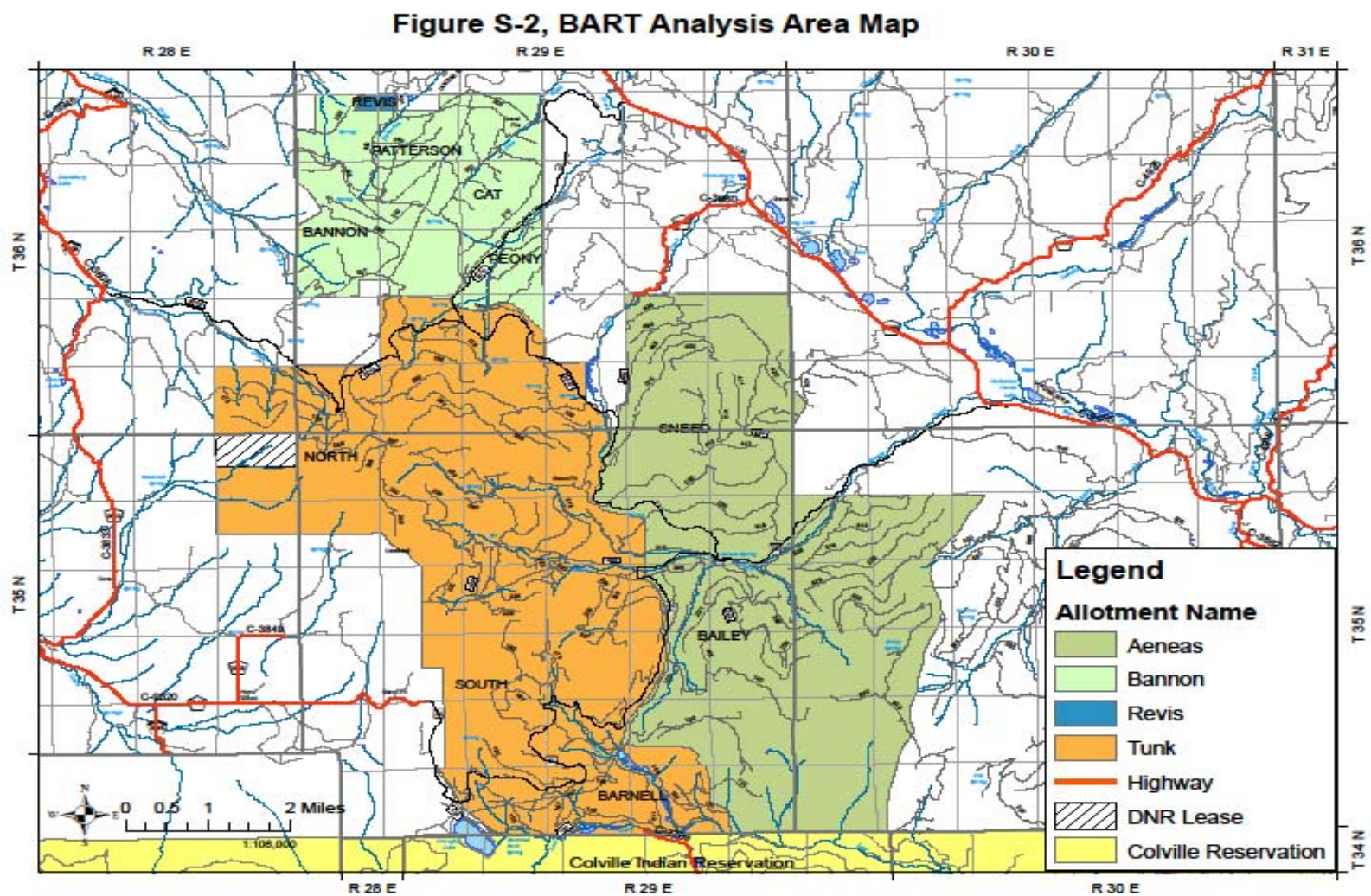


Figure S-2, BART Analysis Area Map

Background

Grazing Permits, Allotment Management Plans (AMPs), and Annual Operating Instructions (AOIs)

Grazing Permits, Allotment Management Plans (AMPs), and Annual Operating Instructions (AOIs) incorporate Forest Plan management direction and other applicable laws, policies and regulatory agency documents (such as ESA consultation), including direction from the project-level NEPA decision. In addition, Forest Service delegated line officers (as recommended by range management staff) have administrative authority and discretion over most operational aspects of permitted livestock grazing management on National Forest System (NFS) lands based on monitoring of rangeland and other resource conditions. Within the scope of the applicable Forest Plan, and the NEPA analysis and resulting decision, term grazing permits, AMPs, and AOIs are subject to modification, based on resource conditions (such as drought, fires,) and administrative or regulatory considerations (such as ESA actions and changes in Forest Plans and agency procedures/policies).

Allotment Management Plans (AMPs) contain the pertinent livestock management direction from the project-level NEPA decision. AMPs are part of the grazing permit and can be modified with a letter to the permittee(s) notifying them of the modification, if within the scope of the NEPA decision.

Permittees and the U.S. Forest Service meet, at least annually, to discuss Annual Operating Instructions (AOI) that specify actions needed to implement the management direction set forth in the project-level NEPA decision such as grazing strategies, range improvement needs, monitoring, and any concerns other Forest Service resource specialists raise. Communications continue throughout the grazing season. This allows the Forest Service and permittee to respond promptly if an issue arises to reduce grazing impacts or conflicts. Permittees are encouraged to participate with Forest Service personnel in monitoring, reporting livestock moves, and range improvement (water sources, fences, and corral) needs.

Currently, three of the four allotments (Bannon, Aeneas, and Tunk) are permitted to three different local livestock ranchers. The Revis Allotment has not been permitted for the past eight years. The table below, Current Head Month (HM) by Allotment, gives information about current permitted livestock on the allotments.

Table S - 1, Current Head Month (HM)¹ by Allotment

Allotment	HMs permitted	AUMs	Livestock Number Cow/Calf pairs	Season of Use
Bannon	602	806	150	6/1-9/30
Aeneas	1203	1610	300	6/1-9/30
Revis#	32	43	8	6/1-9/30
Tunk	1556 (1604*)	2083	388	6/1-9/30

*Includes 48 HMs from adjacent State Department of Natural Resource grazing lease.

#This allotment is presently not grazed.

The Bannon, Aeneas, Revis and Tunk Allotments have been grazed by cattle since the early 1900's. Actual dates and livestock numbers for the early grazing were not well documented until 1906 when grazing fees began to be collected on forest reserves. Oral histories generally indicate much higher livestock grazing numbers on these areas in the early 1900s than at the present. Over time, infrastructure such as water sources, corrals, and fences have been developed in order to improve livestock management and distribution.

² HMs = Head Months, one month's use and occupancy of range by one weaned or adult animal cow, bull, steer, or heifer. Calves are not counted. This is a term used mostly for billing purposes to calculate an occupancy level – how many animals for how long.

Bannon Allotment

Early records indicate the Bannon area was used with either the Tunk or Aeneas Allotments for livestock grazing. The allotment was fenced in 1957, allowing it to be grazed by 100 cow/calf pairs from June 1 through September 30. In 1968, it was established as the Bannon Allotment. In 1977, a division fence was constructed dividing the allotment into East and West units (pastures). In 1981, a four pasture rotation system, implementing rest, was initiated into the allotment with fences between the Patterson, Bannon, Peony Creek and Cat units. This was accomplished through construction of two additional fences, dividing both the East and West units.

In past inspection and inventory notes, including the 1981 Environmental Assessment, and subsequent Allotment Management Plan, and the Watershed Assessment; Peony Creek was identified as an area with heavy ungulate use that needed to be monitored. Plans to improve its condition relied upon the fences and scheduled rest rotations. . The current permitted use is for 150 cow/calf pairs to graze between June 1 and September 30th. This is equivalent of 806 AUMs or 602 HMs. Peony Creek pasture has been rested for 4 of the last 11 years.

Aeneas Allotment

Documentation indicates the area was used by both cattle and horses since the early 1900's. The old Allotment management plan reported that up to 700 head of cattle and horses used this area yearlong before Forest Service management was authorized.

The current permitted use is for 300 cow/calf (c/c) pairs to graze between June 1 and September 30th. This is equivalent of 1610 AUMs or 1203 HMs. The allotment contains two (2) units (pastures): the Sneed (aka: North) unit and the Bailey (aka: South) unit. These units are currently scheduled to be grazed north to south or south to north on alternating years. This unit is bordered to the south by lands owned and managed by the Colville Confederated Tribes (CCT). The last Allotment Management Plan (AMP) was completed in 1969.

Revis Allotment

The Revis Allotment contains one pasture and has been historically used with adjacent private lands. The area was used by horses through the 1920's. Sometime in the 1930's its use was converted to use by both cattle and sheep. In 1951, it was converted to strictly cattle, stocked at 50 cow/calf pair.

This allotment has been rested via non- use for the last eight (8) years (since 2006). Recent photos (Tonasket District files) indicate good availability of forage in this allotment. The last AMP analysis for this allotment was completed in 1973. There are no developed water sources on the Revis Allotment.

Tunk Allotment

Early records indicate the Tunk Allotment received heavy grazing use from the 1890's through the 1930's. Oral histories noted that over 500 head of cattle and numerous undocumented horses used this allotment. Sheep bands of approximately 800 to 1,200 ewes/lambs were trailed through the Lost and Barnell Creek areas, along ridgelines of Bailey Mountain and toward Sneed and Bannon Mountains.

The Tunk Allotment is comprised of three pastures; the North, the South, and Barnell/Lost units. The current permitted use is for 388 cow/calf pairs to graze between June 1 and September 30th. This is equivalent of 2,083 AUMs or 1,556 HMs. On alternating years, the livestock would enter the South unit

first, graze for 1.5 to 2 months, and then move to the North unit and graze for the remainder of the season. On those years, the Barnell unit (Lost and Barnell Creek areas) has scheduled rest.

On the other years, the livestock turn out on the North Pasture and it is used until August 1st, depending upon resource conditions. The cattle are then moved to the South unit, with a small portion 50 to 75 c/c pairs moved into the Barnell unit for 2 to 3 weeks (relative to the livestock numbers) at season's end. The South unit would be grazed approximately August 1st to Sept 30th, except for the livestock numbers allowed to graze in the Barnell unit that year for 2 – 3 weeks. The last Allotment Management Plan (AMP) was completed in 1969.

Purpose and Need

The purpose of this analysis is to provide for grazing while reviewing and evaluating the current condition of the allotment; moving current conditions toward the desired condition; and ensuring the allotment plan is consistent with federal law, regulation, and the amended Okanogan Forest Plan (1989).

The current allotment management plans (AMPs) predate the 1989 Okanogan Forest Plan. There is a need to comply with the Recession Act of 1995 (Public Law 104-19, Section 504, which directs the Forest Service to complete National Environmental Policy Act (NEPA) analysis on all grazing allotments every 10 years. This analysis is needed to ensure that livestock grazing on the Bannan, Aeneas, Revis, and Tunk allotments is consistent with current law, regulation, and management direction.

Reauthorization of grazing permits within the BART Allotments is needed because:

- Where consistent with other multiple use goals and objectives there is Congressional intent to allow grazing on suitable lands (Multiple Use-Sustained Yield Act of 1960, Forest and Rangeland Renewable Resources Planning Act of 1974, Federal Land Policy and Management Act of 1976 and the National Forest Management Act of 1976) without impairment of the productivity, and surface resources of the land. The Bannan, Aeneas, Revis, and Tunk allotments contain lands identified as suitable for domestic livestock grazing in the Okanogan Forest Plan.
- It is Forest Service Policy to make forage available to qualified livestock operators from lands suitable for grazing consistent with land management plans (36 CFR 222.2).
- By regulation, forage producing lands will be managed for livestock grazing where consistent with land management plans (FSM 2203.1).
- The Okanogan National Forest Plan acknowledges grazing as an important use of the National Forest with a focus on coordination of short term and long term planning between livestock use and other resource management (Forest Plan 1989, page 2-27). The goal is to provide a sustained production of palatable forage for grazing by livestock and dependent wildlife species while meeting the needs of other resources and uses at a level which is responsive to site-specific objectives (Forest Plan, page 4-1 through 4-10) as well as to contribute to the social and economic health of communities which are significantly affected by National Forest management.

Recent surveys of the analysis area identified areas that are of concern that are not meeting or moving toward meeting Forest Plan standards and guidelines including PACFISH/INFISH Riparian Management Objectives (RMOs) or Forest Service Manual direction for resources, especially in Peony, Aeneas, Lost, Barnell, Cole, Patterson, Chewiliken, and Jungle Creeks. Therefore, there is a need to analyze alternatives designed to maintain resource conditions currently meeting ecosystem goals and objectives and to improve conditions not meeting goals and objectives.

There is a need to improve these habitat conditions to move them toward Forest Plan and PACFISH/INFISH standards.

- There is a need for livestock grazing on these allotments to meet multiple use objectives.
- There is a need to revise the BART allotments to incorporate current direction and suitable range conditions.
- There is a need to adjust the season of use and livestock numbers according to current measurements of forage production and monitoring data.
- There is a need to build a corral in the Tunk Allotment in the vicinity of Peony Creek and to replace the corral in Jungle Creek and the associated water development with a corral that is not in the riparian area and outside the proposed enclosure.
- There is a need to restrict livestock access to Aeneas Creek and eliminate access to Jungle Creek and the associated wetlands.
- There is a need to remove existing water developments from riparian areas and fence all existing and new water sources.
- There is a need to reconstruct existing water developments including installing new spring boxes, pipes, fences, and troughs.
- There is a need to remove a portion of the Revis boundary fence in Section 7 & 8, Township 36 North, Range 29 East, W.M. in order to incorporate the Revis On/Off Allotment with the Bannon Allotment (Permitted livestock numbers would not increase on the Revis/Bannon allotments).
- There is a need to rest the Peony pasture until indicators of Desired Recovery are reached.
- There is a need to disperse livestock use by providing new water sources throughout the analysis area.

Scope of the Analysis and Decision to be Made

This DEIS discloses the environmental consequences of implementing the proposed action and alternatives to that action. The scope of this analysis is limited to evaluating the appropriate level of permitted livestock grazing, given considerations of rangeland condition and other Forest Plan goals and objectives.

The Responsible Official for this analysis is the Forest Supervisor of the Okanogan-Wenatchee National Forest. At the conclusion of the public review and comment period, the Forest Supervisor will decide whether domestic livestock grazing should be authorized on all, part, or none of the analysis area. The decision would also include the number and kind of livestock, season of use, terms and conditions, design criteria, and monitoring, as needed. New allotment management plans, for each allotment, would be prepared and implemented within two (2) years.

Public Involvement

Public comments were originally requested in May, 2012. Scoping letters were sent to more than 170 entities. Since that time, the BART Grazing Analysis has transitioned from an Environmental Assessment (EA) to an Environmental Impact Statement (EIS) because public comments and internal discussion determined that the proposal may have adverse impacts on stream sediment rates. On November 23, 2012, a Notice of Intent was published in the Federal Register to change the analysis from an Environmental Assessment to an Environmental Impact Statement. On November 26 and 27, 2012 scoping letters were sent to approximately 160 entities, including government agencies, groups, individuals, and other parties that had requested information on general forest or specific range projects.

Interaction with the BART grazing permittees has been ongoing since 2011 and has included at least one field trip and meeting each year.

Government-to-government scoping letters were sent to the Yakama Nation and the Confederated Tribes of the Colville Indian Reservation in May and November, 2012. No comments have been received to date.

Issues

Issues were identified during the public scoping process that raised concerns about the proposed action. Issues serve to compare trade-offs identified during the environmental effects or consequences analysis that may occur from a proposed action and alternatives for the decision-maker. These significant and analysis issues were utilized to develop alternatives or additional mitigation and monitoring not included in the proposed action. The issues identified below as a result of public scoping are considered important enough to analyze in detail.

Significant Issues

Riparian Resources – Livestock grazing have affected riparian and aquatic ecosystems by disturbing streambanks, removing streamside vegetation, and increasing bank erosion, thus adversely affecting fish habitat and other aspects of the aquatic ecosystem. Riparian inventories have documented extensive areas of streambank and riparian vegetation impacts and identified a degrading trend at most sites such that many streams and wetlands are non-functioning (USDA Forest Service 2011, 2012a, and 2012b). Desired conditions that are not being met include adequate riparian vegetation, stream bank stability; narrow channels connected with adjacent floodplains, adequate ground cover, and water table elevations for functioning mountain meadows. Poor riparian and aquatic habitat conditions in the upper watershed are adversely affecting fish habitat below.

Sediment samples and field reviews of streams indicate fine sediment levels are high in most streams and most spawning habitat in fish bearing streams are above the Okanogan National Forest, Forest Plan standard for fine sediment levels. The high fine sediment levels suggest streams in the analysis area are unhealthy for aquatic resources and this is one of the greatest concerns for fish habitat.

The table below describes the significant issues and the indicators used for effects comparison between alternatives.

Table S - 2, Significant Issues and Indicators

Significant Issue	Significant Issue Indicator(s)
Riparian Resources (Aquatics/Fisheries : Livestock grazing has affected riparian and aquatic ecosystems that resulted in degraded aquatic habitat and fish habitat. Livestock can directly trample streambanks, create trailing in active floodplains, and utilize riparian vegetation in a duration and intensity that de-stabilizes stream channels. The results of these impacts can increase floodplain, surface, and stream channel erosion, increase direct solar input to streams, thus making aquatic habitat non-functioning in its ability to support fisheries life history constraints (i.e. spawning and rearing).	Measure or element for evaluation: <ul style="list-style-type: none"> • Riparian Vegetation Conditions; • Streambank Condition; • Stream Sediment;

Hydrology Livestock grazing has affected riparian and aquatic ecosystems by disturbing streambanks, removing streamside vegetation, and increasing bank erosion, thus adversely affecting hydrologic function, fish habitat and other aspects of the aquatic ecosystem.	Measure of element for evaluation: <ul style="list-style-type: none"> • Riparian Vegetation Conditions (bare soil); • Sediment (turbidity as surrogate); • Temperature;
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Analysis Issues

The Table below lists the analysis issues considered for this analysis generated from public comments and/or from the project Interdisciplinary Team. Many comments received focused on improving conditions for all resources, in particular, the health of riparian ecosystems.

Table S - 3, Analysis Issues and Indicators

Analysis Issues and Indicators	Analysis Issue Indicator(s)
Water Quality (Hydrology): Grazing has the potential to indirectly affect beneficial uses and 303(d) listed waterbodies for the pollutants of nutrients, bacteria, and temperature.	Measure or element of evaluation: <ul style="list-style-type: none"> • Expected trend for <i>E. coli</i> bacteria in project area streams; • Expected trend for temperature in project area streams;
Economic Impacts to Permittees and Community, and Efficiency of Management: Communities in Okanogan County have historical ties to agriculture. For many residents, ranching is more than just a form of employment; it is a way of life and supports long-standing family traditions. Livestock grazing has economic and social importance to these communities. These allotments support agricultural jobs and income as well as the ranching way of life for many families. A reduction of AUMs will cause a negative economic impact to the economy of Okanogan County. Smaller pastures will require the movement of cattle by the permittee more often during periods when cattle are difficult to find and move.	Measure or element for evaluation: <ul style="list-style-type: none"> • Number of jobs created; • Costs of Range Improvements; • Acres Available for Grazing; • Average Days/Months on Allotments; • Number of Head Months or AUMS on Allotment; • Grazing fees received by the Treasury; • Payments to the 25 Percent Fund; • Number of pastures (movement of cattle);
Wildlife: Additional fencing can create significant barriers or impediments to normal movement and increase energy demands for wildlife. Grazing effects the habitats of threatened, endangered, and sensitive (TES) wildlife species, migratory birds (MB), and Management Indicator Species (MIS).	Measure or element for evaluation: <ul style="list-style-type: none"> • Miles of Fence Removed; • Miles of Potential Additional Fencing; • Design Elements to Reduce Impacts; • Impacts to threatened, endangered, and sensitive species (TES) wildlife species, migratory birds (MB), management indicator species (MIS), and the associated habitats;
Soil Productivity: Livestock grazing may affect long term soil productivity by reducing effective ground cover and increasing surface erosion.	Measure or element for evaluation: <ul style="list-style-type: none"> ▪ Percent effective ground cover; ▪ Estimated soil erosion; ▪ Number of isolated areas of impact

Analysis Issues and Indicators	Analysis Issue Indicator(s)
	where trend is not maintained or improved;
Invasive Species: Ground-disturbing activities associated with livestock grazing can create opportunities for the establishment of invasive weed infestations, which may result in increased invasive weed populations.	Measure or element for evaluation: <ul style="list-style-type: none"> Number, location, and extent of new infestations in areas used by livestock that are detected while infestations are manageable; i.e. discovered when size and density of the infestation are small enough that they can be eradicated or controlled to prevent further spread;
Range Resources: Livestock grazing may affect rangeland and riparian vegetation health by altering plant community composition and structure.	Measure or element for evaluation: <ul style="list-style-type: none"> Percent and type of vegetation cover and composition relative to desirable and native plant communities;
Recreation: Permitted domestic cattle livestock grazing may conflict with recreational use of camping areas.	Measure or element for evaluation: <ul style="list-style-type: none"> Evidence of domestic cattle livestock activity in camping areas used for recreation;
Threatened, Endangered, and Sensitive Plant Species: (Botany) Livestock can affect sensitive and native plants by grazing and trampling. Some plants of cultural interest to local Indian tribes may be grazed or trampled.	Measure or element for evaluation: <ul style="list-style-type: none"> Trampling and grazing around TESP and cultural plant populations; Decrease of trampling and grazing of sensitive species and habitat; Percent and type of vegetation cover and composition that is maintained or increasing;

Proposed Action

The Proposed Action is to continue livestock grazing at current levels using a combination of range improvements and adaptive management strategies to meet or move toward meeting the amended Forest Plan Standards and Guidelines, PACFISH/INFISH RMOs, and measurable Desired Future Conditions (DFCs). The Proposed Action would implement adaptive management strategies, including possible construction of additional fences or reductions in season of grazing, if monitoring determines that the allotments do not meet or are not moving towards meeting Forest Plan Standards and Guidelines and PACFISH/INFISH RMOs. Adaptive management strategies have been developed for the Tunk and Bannon allotments and are designed to occur in stages (generally 2 - 4 years in duration) that would allow adequate time for range improvements to be constructed and evaluated for effectiveness. Stage 1 implementation would begin within one year once a decision is signed and implemented. It is designed to make range improvements to the current infrastructure by moving structures that are in poor locations, installing additional water developments, and installing/relocating two fences (creating an enclosure area between Jungle Creek and Aeneas Creek). Subsequent stages, 2 through 4, would include changes in management strategies based on the effectiveness of the range improvements made in previous stages. A monitoring plan would be implemented and measurable trigger points developed to identify when a specific threshold is about to be reached and changes need to be made (See Tables S-6, Mitigation Measures and Permit Requirements for the BART Grazing Analysis; Table S-7, Monitoring; Table S-8, Comparison of Alternatives; and S-9, Alternative Comparison of each of the INFISH/PACFISH Riparian Management

Objectives). The construction of additional fences in subsequent years may occur where the permittee and the Forest Service agree that additional fencing would improve livestock management and riparian area conditions. Specific details and locations for Alternative 2 can be found in Figure S-3 at the end of the Summary. Specific details of Alternative 3 can be found in Figure S-4. A summary of the Alternatives is included in Table S – 5, Summary of the Alternatives, on page S-21.

Alternatives

Alternative 1 – No Grazing

Under Alternative 1, all Term Grazing Permits would be cancelled, within 2 years, upon implementation of the decision and resolution of the appeal process. No permits would be issued for any of the affected allotments until, or unless, there was a subsequent NEPA analysis and a decision made to re-stock any or all of the allotments. Permittees would be given two years written advance notice of cancellation of their permits as provided for under 36 CFR 222.4 (a)(1).

During the two years notice, prior to cancellation of the permits, livestock would continue to be managed under current management regimes for the existing permits.

The purpose of the No Grazing alternative is to describe the resource effects of cancellation of grazing permits, with no livestock grazing taking place. Motorized access and travel management, timber management, road maintenance, recreation, noxious weed management, and fire protection would continue if this alternative was selected.

Alternative 2 – Proposed Action (Preferred Alternative)

The proposed action is to continue livestock grazing at current levels using a combination of existing and new range improvements for each allotment and adaptive management strategies for the Bannan and Tunk allotments to ensure that livestock impacts that affect stream embeddedness decrease, do not adversely affect other resource conditions, and reduce the risk of increased costs associated with additional fencing. Monitoring would be used to assess whether or not conditions, where specified, are moving towards Forest Plan Standards and Guidelines and PACFISH/INFISH Riparian Management Objectives (RMOs). The implementation process is designed to occur in stages that would allow adequate time for range improvements to be funded, constructed, and evaluated for effectiveness (see Table S -4, Stage Decision Point Timing, for estimated timing between stages). Adaptive management strategies for Bannan and Tunk allotments may or may not be implemented based on the effectiveness of the range improvements executed under Stage 1 or subsequent stages (See Figure S-3, Alternative 2).

A monitoring plan has been developed, and trigger points for riparian utilization has been established to identify when a specific threshold is about to be reached and changes need to be made (generally moving cattle to another pasture). The construction of additional fences and grazing strategies in subsequent stages may occur where the permittee and the Forest Service agree that additional fencing would improve livestock management and riparian area conditions. Indicators of desired recovery have been established to determine when grazing could be returned to pastures where grazing has been excluded.

The specific move trigger points for Riparian Utilization are:

- Streambank Alteration of 15% (start moving cattle off prior to exceeding 20% alteration);

- Not to go below a 6-inch mean stubble height for grasses, forbs, or sedges along the green line (habitat needs to be suitable to providing a stubble height of greater than 6-inches).

See the Monitoring section starting on page S-31, for the complete monitoring plan. Key to the implementation strategy is allowing adequate time during implementation to first, complete the proposed improvements, second, monitor conditions and third, if needed, allow appropriate permit administration to occur before any subsequent stages would be initiated. The proposed, staged implementation process is described below.

Implementation Process

Stage 1

All Allotments

Stage 1 is similar between Alternatives 2 and 3. All proposed improvements described in Alternative 2 would be implemented except the six proposed spring sources *inside* the rested pastures and the corral adjacent to Forest Road 3015 would not be developed until pastures being rested under Alternative 3 are ready to be grazed again (all are in the Tunk and Bannon Allotments). These water developments and the corral would be developed prior to the return of grazing. Those six water developments and the corral are identified below in the Stage 1 description. See Figures S-3, Alternative 2, and S-4, Alternative 3, for the location of the structures listed below.

Bannon and Revis Allotments:

Remove a portion of the Revis boundary fence, about 1.1 miles in length, in Section (S.) 7 & 8, Township (T.) 36 N., Range (R.) 29 E in order to incorporate the Revis Allotment with the Bannon Allotment. (Permitted livestock numbers would not increase on the two allotments).

Rest the Peony pasture until Indicators of Desired Recovery are reached. The corral located in the Peony Pasture, would be utilized periodically for livestock control while moving cattle between pastures, and during gathering at the end of the grazing season.

Remove the Bannon water catchment structure in the NW ¼ of S. 7, T. 36 N., R. 29 E.

Move the Patterson trough out of the creek at SW ¼ of S. 8, T. 36 N., R. 29 E. and fence the water source.

Along Cole Creek move the Mike trough out of the inner gorge of the riparian area and install a small enclosure fence to protect the spring source at the creek in the SE ¼ of S. 9, T. 36 N., R. 29 E.

Develop a spring source and place a trough or crib just above the fence in the Peony Pasture, NW ¼ of S. 21, T. 36 N., R. 29 E. Install a small enclosure fence to protect the spring source (delayed construction in alternatives 2 and 3 until the Peony pasture, being rested, is ready to be grazed again).

Reconstruct the Grouse water development, install a new spring box, pipes, fence, and trough in the SW ¼ of the SE ¼ of S. 19, T. 36 N., R. 29 E..

Reconstruct the pasture water development, including an enclosure fence, in the NE ¼ of the SE ¼ of S. 21, T. 36 N., R. 29 E.

Aeneas Allotment:

Install a fence (approximately 1.5 miles long) north of National Forest Road 30 (S. 11 & 12, T. 35 N., R. 29 E.) that would restrict livestock access to Aeneas Creek and eliminate access to Jungle Creek and the associated wetlands. This construction, and the movement of the fence listed below, will create an enclosure area incorporating portions of Jungle and Aeneas Creeks.

Move approximately 1 mile of existing fence to the south, out of the riparian area on the south side of Aeneas Creek in S. 14, T. 35 N., R. 29 E.

Develop the spring source with a pump and two troughs above the new fence in the Sneed pasture at Aeneas Creek, S. 12, T. 35 N., R. 29 E.. Install a small enclosure fence to protect the spring source.

Develop the spring source and place trough in the SW ¼ of the SE ¼ of S. 7, T. 35 N., R. 30 E. Fence around spring source and meadow, < ½ acre.

Develop the spring source and place trough in the NW ¼ of S. 31, T. 35 N., R. 29 E. Fence around the wetland, < 1/10th acre.

Develop the spring source and place trough in the SE ¼ of the NW ¼ of S. 11, T. 35 N., R. 29 E. Install a small enclosure fence to protect the spring source.

Install a hardened, rocked, and fenced, crossing for livestock access and watering at Aeneas Creek. A wire gate would be installed in the fence at this crossing.

Relocate the Jungle Creek corrals away from Jungle Creek, to a location outside of the RHCA, and remove the existing trough from Jungle Creek (S. 11, T. 35 N., R. 29 E.

The length and timing of livestock grazing within the Bailey pasture (South pasture) would be adjusted if monitoring determines that sediment levels in Aeneas Creek are not moving towards meeting Forest Plan Standards and Guidelines and INFISH/PACFISH RMOs for sediment. A likely scenario would be for an early season, reduced grazing period (June 1 to July 1) during alternating years with a mid-season reduced grazing period (July 1 to August 1) during alternate years.

Tunk Allotment:

Continue the current practice of resting the Lost/Barnell pastures every other year. On grazed years, monitoring would be implemented to ensure that conditions along Lost and Barnell Creeks remain on a trajectory towards attaining Forest Plan Standards and Guidelines/Riparian Management Objectives. Triggers have been developed which would determine the need to move cattle. Range readiness for soils and vegetation must be met. This means soils must be firm at the time of livestock turnout, after approximately July 1 and prior to approximately September 1. Livestock use will be authorized during times when aspen and willows are less attractive to browsing. Upon reaching Indicators of Desired Recovery, additional grazing may be considered.

Construct a corral adjacent to Forest Road (FR) 3015 on the south side of the junction of FSR 3015 and FSR 30150125 in the NW ¼ of S. 29, T. 36 N., R. 29 E. (delayed construction in alternative 3, Area B).

Develop a spring source, place trough, and construct a fence to protect the source and adjacent wetland in the SW ¼ of S. 29, T. 36 N., R. 29 E. (delayed construction in alternative 3, Area B).

Develop a spring source and place a crib or trough in the SE ¼ of the NE ¼ of S. 31, T. 36 N., R. 29 E.
Install a small enclosure fence to protect the spring source.

Develop a spring source and place a trough at the spring outside No Name Creek in the NE ¼ of the SE ¼ of S. 36, T. 36 N., R. 28 E. Install a small enclosure fence to protect the spring source.

Develop a spring source and place two livestock watering troughs in the NE ¼ of S. 33, T. 36 N., R. 30 E.
Construct a fence to protect the water source and wetland.

Develop a spring source and place a crib or trough in the NW ¼ of the SW ¼ of S. 3, T. 35 N., R. 29 E.
Install a small enclosure fence to protect the spring source.

Develop two springs and place cribs or troughs in the NE ¼ of S. 22, T. 35 N., R. 29 E. Install a small enclosure fence to protect the spring source (delayed construction in alternative 3, Area C).

Develop a spring source and place crib or trough in the SW ¼ of S. 21, T. 35 N., R. 29 E. Install a small enclosure fence to protect the spring source (delayed construction in alternative 3, Area D).

Remove a temporary fence along Barnell Creek in S. 27, T. 35 N., R. 29 E., about 0.6 miles in length.

Move the Block water development downhill and install a crib in the NE ¼ of S. 27, T. 35 N., R. 29 E.
Install a small enclosure fence to protect the spring source.

Reconstruct the unnamed water development in the SE ¼ of S. 22, T. 35 N., R. 29 E. Install a small enclosure fence to protect the spring source.

At Bench Creek, develop a spring source, fence around the spring source for protection, and place a trough below the road in the SE ¼, S. 34, T. 36 N., R. 29 E..

Develop a spring source and place a trough at the spring in the draw in SW ¼, S. 4, T. 35 N., R. 29 E. Fence the water source and wetland (delayed construction in alternative 3, Area C).

Develop a spring source and place a trough at the spring in the NE ¼, S. 4, T. 35 N., R. 29 E. Fence the water source and wetland (delayed construction in alternative 3, Area C).

Develop a spring source and place a trough at the spring in the shallow draw east of Peony Creek and north of FSR 3010 in the NE ¼ of the SW ¼, S. 28, T. 36 N., R. 29 E.. Fence the water source and wetland (delayed construction in alternative 3, Area B).

Adaptive Management Strategies for Bannan and Tunk Allotments

Stages 2, 3, and 4 are shown in an example order for discussion purposes only. Their order of implementation may be modified based on project monitoring results of the associated stream reaches with management actions to be completed first in the stream reaches most in need of reduced riparian impacts from livestock. The order will be determined based on monitoring of conditions described by the Project Fish Biologist and Project Hydrologist.

Stage 2, Tunk and Bannan Allotments

If monitoring of management strategies described in Stage 1 indicates that the health and functions of the riparian resources are degrading as a result of livestock use or resources are not moving towards meeting

Forest Plan Standards, DFCs, or preventing or retarding the attainment of PACFISH/INFISH Riparian Management Objectives (RMOs) in Upper Jungle Creek of the Tunk Allotment, then, if agreed to by the permittee, construct fence 2 as shown in Figure S-3, Alternative 2. This fence would be approximately 3.9 miles in length around the north slopes of Jungle Creek and tributaries within the SE ¼ of S. 32, T. 36 N., R. 29 E. and Sections 3, 4, 5, 6, 7, & 8 of T. 35 N., R. 29 E. and will tie into existing fences. This would create an additional pasture (Area C; See Figure S-3, Alternative 2) within the North Unit of the Tunk Allotment that would be grazed as determined by forage capacity and Desired Future Conditions. Active herding would be authorized through this pasture into the area west and north of the fence along existing routes of stock drives and roads when moving from the North to South pastures.

The proposed fence is designed to aid in livestock management and reduce livestock impacts to Upper Jungle Creek and Aeneas Creek. Livestock grazing would continue within the new fenced pastures unless monitoring indicates that trigger points, indicating a need to move livestock are being reached. Cattle would then be moved to the next pasture or off the Forest.

Stage 3, Tunk and Bannon Allotments

If, after monitoring a full grazing season after completion of Stage 2, indicates that the health and function of the riparian resources are not improving as a result of livestock use or resources are not moving towards meeting Forest Plan Standards or preventing or retarding attainment of PACFISH/INFISH Riparian Management Objectives (RMOs) in the Aeneas and Jungle Creek areas of the Tunk Allotment, then Stage 3 adaptive management would be implemented.

With the permittees agreement, construct approximately 3.2 miles of fence from the Forest Boundary in S. 17, T. 35 N., R. 29 E., east to Forest Road 30 in S. 23 in order to create an additional pasture (Area D; See Figure S-3, Alternative 2) south of the existing boundary fence between the North and South pastures, that would be grazed as determined by forage capacity. Active herding would be authorized through this pasture into the area west and north of the fence along the existing route of stock drives and roads, when moving from the North to South units.

Stage 4, Tunk and Bannon Allotments

If, monitoring a full grazing season following Stage 3 implementation, indicates that the health and function of resources is degrading as a result of livestock use or resources are not moving towards meeting Forest Plan Standards, or preventing or retarding attainment of PACFISH/INFISH Riparian Management Objectives (RMOs) in the Patterson and Upper Peony Creek areas of the Tunk and Bannon Allotments then Stage 4 adaptive management would be implemented.

With permittee agreement, this would entail constructing approximately 2.7 miles of fence around Peony Creek within the North pasture of the Tunk Allotment (Sections 28, 29, 30, 32, and 33 of T. 36 N., R. 29 E.). This would create an additional pasture (Area B; See Figure S-3, Alternative 2) within the North pasture that would be grazed as determined by forage capacity and desired conditions. Active herding would be authorized through this pasture into the area west and north of the fence along existing stock drives and roads when moving from the North to South Pastures.

With permittee agreement, this would also entail constructing approximately 1.3 miles of fence along Patterson Creek (Area A) in the Bannon Allotment (Sections 8 & 18, T. 36 N., R. 29 E.). A water gap would be installed along this fence in section 8.

Stage 5, Tunk and Bannan Allotments impacts in the Bannan and Tunk allotment(s). Monitoring requirements and parameters are shown starting on page S-31. If the stream banks do not begin to stabilize and exhibit signs of healing from trampling effects, such as improved vegetative ground cover, then reductions in the current grazing season, reductions in the numbers of Animal Unit Months (AUMs) of grazing, and/or using a rest/rotation strategy for 2 years for the affected allotments would be implemented. If that is not successful, total livestock exclusion from the 4 fenced areas (A, B, C, D) would be implemented. It is expected that the Indicators of Desired Recovery shown in Standards for When to Re-graze Pastures, Alternatives 2 and 3 (page S- 19) and Riparian Vegetation Condition Criteria for Re-grazing (page S-35), would be fully met prior to the return of grazing on the Bannan and Tunk allotments. The table below, Stage Decision Point Timing, estimates the time for monitoring between moving between the different stages of the project for Alternative 2. This period between starting the project and moving to stage 5 would be 10 – 13 years under Alternative 2.

Table S - 4, Stage Decision Point Timing

Stage	Estimated Monitoring Time Between Moving to Next Stage (years)	Comments
1	4	It is assumed that it will take 2 years to complete removal/reconstruction and construction of items in Stage 1. The construction of the Jungle Creek fence (new fence construction year 1) and moving the Aeneas Creek fence south (year 1) , moving of the Jungle Creek Corral, and construction of most of the water developments and other facilities in the first year with the remainder of the construction in the second year. This would be followed by 2 years of monitoring to determine if management strategies have reduced livestock impacts on riparian areas. Monitoring will look for overall improvement (assume some monitoring locations will improve and some monitoring locations may stay the same or deteriorate).
2+	2 - 3	It is assumed that construction of the 3.9 miles of fence, fence 2, would be completed in one - two years and that would be followed by one year of monitoring to determine if management strategies had reduced livestock impacts on riparian areas and resources are moving towards meeting Forest Plan Standards & Guidelines and PACFISH/INFISH Riparian Management Objectives (RMOs).
3+	2 – 3	It is assumed that the construction of the additional 3.2 miles of fence (fence 3) would be completed in one – two years and that would be followed by one year of monitoring to determine if management strategies had reduced livestock impacts on riparian areas and resources are moving towards meeting Forest Plan Standards and Guidelines and PACFISH/INFISH RMOs.
4+	2 - 3	It is assumed that the construction of the additional 4.0 miles of fence (fences 4) would be completed in one – two years and that would be followed by one year of monitoring to determine if management strategies had reduced livestock impacts on riparian areas and resources are moving towards meeting Forest Plan Standards and Guidelines and PACFISH/INFISH RMOs.
5	N/A	If improvements and livestock management strategies are not protecting the continued health and function of resources or are not improving riparian conditions in the Bannan and/or Tunk allotment(s), in particular stream banks, additional administrative measures would be taken to reduce livestock impacts, such as reductions in the current grazing season, reductions in numbers, and/or a rest rotation strategy for 2 years for the affected pastures that have not shown an overall improvement to determine if there is adequate improvement. If no improvements are shown after 2 years, total livestock exclusion from the 4 fenced pastures [A, B, C, D] (only the pastures that have not shown an overall improvement) would be implemented. It is expected that the Standards for When to Re-graze Pastures, Alternatives 2 and 3, below and Riparian Vegetation Condition Criteria for Re-grazing on page S-35, would be fully met prior to the return of grazing on these pastures.

- + *Stages 2, 3, and 4 are shown in an example order for discussion purposes only. Their order of implementation may be modified based on project monitoring results of the associated stream reaches with management actions to be completed first in the stream reaches most in need of reduced riparian impacts from livestock. The order will be determined based on monitoring of conditions described by the Project Fish Biologist and Project Hydrologist. All fences will be constructed within a 2 year period of moving to the next stage, after stage 1. The time period between stages is based on 1 year of monitoring after the fences are constructed. Monitoring will look for overall improvement (assume some monitoring locations will improve and some monitoring locations may stay the same or deteriorate).*

Standards for When to Re-graze Pastures, Alternatives 2 and 3

Pastures would be rested until riparian and aquatic habitats are functioning properly. Suitable conditions for re-grazing include, but are not limited to, bank stability of 90%, or greater, as well as a robust streamside vegetation composition that armors the fine-grained streambanks, resists erosion, provides shade and nutrient input, and inhibits cattle access. Following a few years of rest and some annual monitoring, the ID Team would review the monitoring site for meeting the above desired conditions. The team would assess riparian conditions to determine if the area is ready to handle grazing again and at what intensity.

Alternative 3

Alternative 3 was developed to provide cattle grazing and accelerated riparian resource improvement to streams functioning at risk to reduce stream embeddedness and stabilize stream banks that are not meeting Forest Plan Standards and Guidelines, and PACFISH/INFISH Riparian Management Objectives (RMOs). This alternative includes management flexibility to cope with fluctuations in short term environmental changes, such as seasonal weather patterns, while providing the ability to respond to permittee requests for reasonable operational adjustments.

This alternative is anticipated to be implemented within a four year time frame (described below) that includes the installation of water developments and fences in the first year (year 1 fence construction and relocation, see Figure S-4, Alternative 3), the construction of a fence in the North Tunk pasture in the second year (fence 2), and the remainder of the proposed fences (fences 3 and 4) would be installed in the 3rd and 4th years. The 4 new pastures (A, B, C, & D, shown in Figure S-4, Alternative 3) which are not currently meeting Forest Plan Standards and Guidelines and PACFISH/INFISH RMOs would be rested until the desired future condition is met. The intent is for long-term rest of these pastures, likely greater than 10 years.

This alternative incorporates new water developments, fences, rested pastures, and monitoring to accelerate improvement of degraded riparian and stream conditions. Monitoring would determine progress in attainment of Forest Plan Standards and Guidelines, and attainment of PACFISH/INFISH RMOs in both rested and non-rested pastures. Monitoring results would be used to determine the length of time each non-rested pasture is grazed, as well as progress in achievement of desired conditions in rested pastures.

The same monitoring plan used for Alternative 2 would be used to assess whether or not the desired results for Forest Plan Standards and Guidelines, and PACFISH/INFISH RMOs are being achieved. Trigger points for riparian utilization as described below have been developed and would be utilized to identify when a specific threshold is about to be reached and cattle need to be moved. For instance, if monitoring indicates that a threshold for stream bank alteration is being reached, that would trigger the need to move cattle to the next pasture or off the allotment prior to the end of the season.

The specific trigger points for Riparian Utilization are:

- Streambank Alteration of 15% (start moving cattle off prior to 20% alteration);
- Stream –side stubble height not to go below a 6-inch mean stubble height for grasses, forbs, or sedges along the green line

See the Monitoring requirements and parameters starting on page S-31 for the complete monitoring plan.

Bannon and Revis Allotments

All proposed improvements described in Alternative 2 would be implemented including the construction of 1.3 miles of fence along the west side of Patterson Creek in Sections 8 and 18 of T. 36 N., R. 29 E. A water gap would be installed along the Patterson Creek fence in Section 8.

Aeneas Allotment:

All proposed improvements described in Alternative 2 would be implemented.

Tunk Allotment:

All proposed improvements described in Alternative 2 would be implemented except the six proposed spring sources/water developments and the corral adjacent to Forest Road 3015 *inside* the rested pastures would not be developed until pastures being rested are ready to be grazed again. These spring sources/water developments and corral would be developed prior to the return of grazing in these pastures. These developments are listed below and are shown in Figure S-4, Alternative 3

Construct a corral adjacent to Forest Service Road (FSR) 3015 on the south side of the junction of FSR 3015 and FSR 30150125 in the NW ¼ of S. 29, T. 36 N., R. 29 E. (Area B).

Develop a spring source, place trough, and construct a fence to protect the source and adjacent wetland in the SW ¼ of S. 29, T. 36 N., R. 29 E. (Area B).

Develop two springs and place cribs or troughs in the NE ¼ of S. 22, T. 35 N., R. 29 E. Install a small enclosure fence to protect the spring source (Area C).

Develop a spring source and place crib or trough in the SW ¼ of S. 21, T. 35 N., R. 29 E. Install a small enclosure fence to protect the spring source (Area D).

Develop a spring source and place a trough at the spring in the draw in SW ¼, S. 4, T. 35 N., R. 29 E. Fence the water source and wetland (Area C).

Develop a spring source and place a trough at the spring in the NE ¼, S. 4, T. 35 N., R. 29 E. Fence the water source and wetland (Area C).

Develop a spring source and place a trough at the spring in the shallow draw east of Peony Creek and north of FSR 3010 in the NE ¼ of the SW ¼, S. 28, T. 36 N., R. 29 E.. Fence the water source and wetland (Area B).

Implementation Process:

Year 1

- Relocate or remove undesirable troughs as described above and in Alternative 2.
- Develop new water sources outside proposed rested areas.

- Construct approximately 1.5 miles of fence north of Jungle Creek in the Aeneas Allotment.
- Move approximately 1 mile of existing fence to the south, out of the riparian area on the south side of Aeneas Creek in S. 14, T. 35 N., R. 29 E.
- Initiate other improvements as described in Alternative 2, above, such as drift fence removal along Barnell Creek, corral removal in Jungle Creek & new construction adjacent to Forest Road 30.

Year 2

- Construct approximately 3.9 miles of fence around the north slopes of Upper Jungle Creek and tributaries within (SE ¼, S. 32, T. 36 N., R. 29 E., and Sections 3, 4, 5, 6, 7, & 8, T. 35 N., R. 29 E.), North Unit of Tunk Allotment that will tie into existing fences, for rest from livestock grazing. Rest would continue until Forest Plan Standards and Guidelines and PACFISH/INFISH RMOs are achieved in the SE ¼, S.32, T. 36 N., R. 29 E., and Sections 3, 4, 5, 6, 7, and 8, T. 35 N., R. 29 E.

Year 3

- Construct approximately 3.2 miles of fence from the Forest Boundary in S. 27, T. 35 N., R. 29 E., east to FSR 30 in Section 23 south of the existing boundary fence between the North and South units in the Tunk Allotment, for rest from livestock grazing.

Year 4

- Construct approximately 2.7 miles of fence around Peony Creek within the North Pasture. This would create an additional pasture within the North Unit that would be grazed as determined by forage capacity and DFCs (Sections 28, 29, 30, 32, and 33, T. 36 N., R. 29 E.).
- Install approximately 1.3 miles of fence along west side of Patterson Creek in the Bannon Allotment, with a water gap.

Reintroduction of limited livestock grazing would be considered after the Forest Plan Standards and Guidelines and PACFISH/INFISH RMOs in the rested pastures have been reached. This is further display in the Standards for when to Re-graze Pastures, Alternatives 2 and 3 starting on page S-19 and Riparian Vegetation Condition Criteria for Re-grazing starting on page S-35.

Summary of Alternatives

Table 5, Summary of Alternatives, below, provides a quick summary of some of the key points about each alternative.

Table S - 5, Summary of Alternatives

	Alternative 1	Alternative 2	Alternative 3
Grazing	Grazing would continue for up to 2 years following the decision. After that, no grazing would be allowed without a new NEPA decision.	On an annual basis range management strategies, such as livestock numbers and period of use may be used in response to resource needs, range readiness, and monitoring. The Animal Unit Month numbers shown in Table S-1 (page S-6) for each allotment is the maximum use limit.	On an annual basis range management strategies, such as livestock numbers and period of use may be used in response to resource needs, range readiness, and monitoring. The Animal Unit Month numbers shown in Table S-1 (page S-62) for each allotment is the maximum use limit.

	Alternative 1	Alternative 2	Alternative 3
Time Frame	Grazing would continue for up to 2 years following the decision. After that, no grazing would be allowed without a new NEPA decision.	The proposed actions are designed to occur in Stages that would allow adequate time for improvements to be constructed and evaluated for effectiveness. Monitoring would determine the need to implement additional Stages. Expected time frame is less than 15 years.	This alternative is expected to occur over a four year time frame that includes the installation of water developments and construction of a fence along Jungle Creek and movement of a fence south of Aeneas Creek in the first year, the construction of a fence in the North Tunk pasture in the second year, the construction of a fence in the South Tunk allotment in the third year, and the construction of the remainder of the proposed fences in the 4th year.
Pasture Rest	Grazing would continue for up to 2 years following the decision. After that, no grazing would be allowed without a new NEPA decision.	<p>Rest Peony Pasture until the criteria, listed starting on page S-19 and S-35, for when to re-graze rested pastures is fully met.</p> <p>Continue to rest Lost/Barnell pastures every other year.</p> <p>Monitoring would determine the need for resting pastures A, B, C, and/or D during Stage 5. The criteria, listed starting on page S-19 and S-35, for when to re-graze rested pastures would be fully met prior to returning grazing to the above 4 pastures</p>	<p>Rest Peony Pasture until the criteria, listed starting on page S-19 and S-35, for when to re-graze rested pastures is fully met.</p> <p>Continue to rest Lost/Barnell pastures every other year.</p> <p>Year 3 and beyond, rest pasture C (Jungle Creek pasture) of the north unit of the Tunk allotment until the criteria, listed starting on page S-19 and S-35, for when to re-graze rested pastures is fully met</p> <p>Year 4 and beyond, rest pasture D (North Pasture in South Unit of Tunk Allotment) until the criteria, listed starting on page S-19 and S-35, for when to re-graze rested pastures is fully met.</p> <p>Year 5 and beyond, rest pastures A (East Patterson Creek) and B (Upper Peony Creek) in Barnell and Tunk Allotments, respectively until the criteria, listed starting on page S-19 and S-35, for when to re-graze rested pastures is</p>

	Alternative 1	Alternative 2	Alternative 3
			fully met
Livestock numbers and Grazing	0 AUMs/ 0 HMs after 2 years	Total AUMs 4,451 or Total HMs 3,361*	Total AUMs 4,451 or Total HMs 3,361*
Improvements and Structures	<p>All current infrastructures would be left to deteriorate over time, or be salvaged, if possible, except for allotment boundary fences that adjoin other allotments outside the analysis area.</p> <p>Maintenance of these allotment boundary fences would be assigned to adjacent permittees.</p>	<p>1.5 miles of fence construction and 1.0 mile of fence relocation, plus spring source protection fencing.</p> <p>Monitoring would determine the need for an additional 10.1 miles of optional fence construction per adaptive management.</p> <ul style="list-style-type: none"> • Bannon/Revis: 1.3 miles • Aeneas: 0 miles • Tunk: 8.8 <hr/> <p>Develop 16 new spring sources, including fencing of the water sources, if feasible</p> <ul style="list-style-type: none"> • Bannon/Revis: 1 • Aeneas: 4 • Tunk: 11 <hr/> <p>Move or reconstruct 7 water developments including fencing of the water sources, if feasible:</p> <ul style="list-style-type: none"> • Bannon/Revis: 5 • Aeneas: 0 • Tunk: 2 <hr/> <p>Construct 1 new corral and relocate 1 existing corral.</p>	<p>13.6 miles of fence construction/reconstruction plus spring source protection fencing.</p> <ul style="list-style-type: none"> • Bannon/Revis: 1.3 miles plus spring protection fences. • Aeneas: 2.5 miles plus spring protection fences. • Tunk: 8.8 miles plus spring protection fences. <hr/> <p>Develop 13 new spring sources, including fencing of the water sources, if feasible</p> <ul style="list-style-type: none"> • Bannon/Revis: 1 • Aeneas: 4 • Tunk: 8 <p>After rest is completed and prior to the return of cattle to the rested pastures (A, B, C, D, and Peony Pasture) an additional 7 water developments would be installed in the rested pastures, including fencing of water sources, if feasible.</p> <hr/> <p>Move or reconstruct 7 water developments, including fencing of the water sources</p> <ul style="list-style-type: none"> • Bannon/Revis: 5 • Aeneas: 0 • Tunk: 2 <hr/> <p>Construct 1 new corral and relocate 1 existing corral.</p>

* Only includes Head Months and AUMs on National Forest System land.

Mitigation Measures, Management Requirements, and Best Management Practices

Mitigation Measures

The National Environmental Policy Act defines “mitigation” as avoiding, minimizing, rectifying, reducing, eliminating or compensating for project impacts.

Mitigation measures are important mechanisms used by the BART analysis team to minimize the potential adverse environmental impacts associated with the proposed actions. For the BART analysis, mitigation measures are included in the design of this project and are integral components of Alternative 2, the proposed action, and Alternative 3. For example, alternative design features such as the proposed fences and water developments are designed to reduce adverse impacts to streams and riparian areas. Additional mitigation measures have been developed to minimize, reduce or avoid any potential adverse impacts to other resources such as reducing the risk of noxious weed establishment.

Many mitigation measures are considered to be Best Management Practices (BMPs) for watershed, and vegetation management and General Water Quality Management. Best Management Practices are “practices or combinations of practices that are determined by a State (or designated area-wide planning agency) after problem assessment, examination of alternative practices, and appropriate public participation, to be the most effective, practicable (including technological, economic, and institutional considerations) means of preventing or reducing impacts to water quality and other resources.

In addition to BMPs, included in the project design, are Forest Plan Standards and Guidelines which are standards for resource protection, vegetation manipulation, riparian areas, soil and water diversity, to be met in accomplishing National Forest System goals and objectives (Okanogan National Forest, Land and Resource Management Plan [LRMP], Final Environmental Impact Statement, [FEIS] USDA, 1989). Table S-6, below, describes the mitigation measures developed specifically for issues relating to this project.

Table S - 6, Mitigation Measures and Permits Requirements for the BART Grazing Analysis

Mitigation Measure	Objective	Effectiveness/Rationale	Administration
Noxious Weeds			
Coordinate livestock entry with on-going herbicide applications authorized in previous NEPA decisions (USDA 2000a & 1997) to yellow hawkweed sites in Sections 9, 10, 15, & 16, T. 35 N., R. 28 E.	To avoid livestock grazing on flowering yellow hawkweed before application and until herbicide has dried.	HIGH Label requirements and Noxious Weed Specialist experience	Rangeland Management Specialists or Noxious Weed Specialists
Avoid travel through existing weed patches and minimize the amount of disturbance caused by ATV/UTV travel.	To reduce the risks of spreading existing weed populations throughout the analysis area.	HIGH: Noxious Weed Specialist Experience	Rangeland Management Specialists or Noxious Weed Specialists
Apply Noxious Weed Best Management Practices (BMPs) and site specific BMPs for preventing noxious weeds during grazing activity. The following is listed in more detail in the analysis file and Appendix I, Noxious Weed Risk Assessment & BMPs.	To reduce the spread of noxious weeds by livestock.	MODERATE to HIGH: Noxious Weed Specialist Experience	Noxious Weed Specialists, Rangeland Management Specialists, and the permittees
Use weed-free or weed-seed-free hay or straw (or best available) in	Prevention	MODERATE: Noxious Weed	Noxious Weed Specialists,

Mitigation Measure	Objective	Effectiveness/Rationale	Administration
permitted areas.		Specialist Experience	Rangeland Management Specialists, the permittees
Feed weed-free feed to livestock for several days prior to moving them onto the allotment to reduce the introduction of new invaders and spread of existing weed species. Use transitional pastures when moving animals from weed infested areas to the National Forest and before leaving National Forest System lands. (Transitional pastures are designated fenced areas that can be logistically and economically maintained).	Prevention	MODERATE: Noxious Weed Specialist Experience	The permittees are responsible.
If livestock are transported from a weed-infested area, hold them for seven to ten days prior to moving into an uninfected area at a designated holding pen. Monitor holding site for noxious weed introduction.	Prevention	MODERATE to HIGH: Noxious Weed Specialist Experience	Weed Coordinator & Technicians Rangeland Management Specialist & Technicians and the permittees.
Discuss weed prevention practices and control measures at annual meetings and include outcomes in the Annual Operating Plans. Items to be addressed in the plan may include: minimizing ground disturbance, weed seed transportation, maintaining healthy vegetation, control methods, re-vegetation, monitoring, reporting, and education.	To reduce the spread of noxious weeds by livestock.	MODERATE to HIGH: Noxious Weed Specialist Experience	Weed Coordinator & Technicians, Rangeland Management Specialist, & Technicians and the permittees
Develop weed identification and mapping program for permittees, provide permittees with weed identification material.	Educate and assist in early detection	MODERATE to HIGH: Noxious Weed Specialist Experience	Weed Coordinator, Rangeland Management Specialist & Technicians, and the permittees
Exclude livestock from sites with new invaders or manage new invaders in these areas before entry by livestock.	Prevention	MODERATE to HIGH: Noxious Weed Specialist Experience	Weed Coordinator & Technicians Rangeland Management Specialist & Technicians, and the permittees
Re-vegetate, reseed, bare soil areas due to grazing activities	Prevent introduction or establishment of weeds	MODERATE to HIGH: Experience	Weed Coordinator & Technicians, Botanist,

Mitigation Measure	Objective	Effectiveness/Rationale	Administration
			Rangeland Management Specialist & Technicians, and the permittees
Check areas of concentrated livestock use for weed establishment. Treat new infestations under existing NEPA decisions (USDA 2000a and 1997) and under future invasive species decisions (Okanogan – Wenatchee National Forest Invasives Plant Treatment EIS).	Early detection for preventing spread and facilitating Forest Service control measures	MODERATE to HIGH: Experience	Weed Coordinator & Technicians, Rangeland Management Specialist & Technicians, and the permittees
Inspect & clean all off road (ex: ATVs/ UTVs) equipment prior to entering the project site. Clean equipment prior to leaving site only if new invaders are present.	Prevention	MODERATE: Experience	Weed Coordinator, Rangeland Management Specialist, & Botanists, and the permittees
Wildlife			
All human, prepared livestock and pet foods, and human refuse associated with livestock operations would be properly stored, handled, and disposed of. This includes using canned food or storing food in other sealed containers. All edibles and garbage should be hung out of reach, secured in a solid-sided bear-proof container, burned, or packed out.	To discourage grizzly bears from being attracted to human camps and becoming acclimated to humans.	HIGH: Experience, Grizzly Bear Guidelines (1986)	Rangeland Management Specialist & Technicians, other Forest Service personnel
Permittees should take appropriate measures to prevent turnout of sick or diseased animals. Sick or diseased animals would be removed or eliminated as soon as possible after their recognition, so they are not targeted by bears or wolves.	To prevent spread of disease and prevent the death of livestock on the allotments	MODERATE to HIGH: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
Livestock carcasses found on areas of the allotment where they would attract bears and wolves to a potential conflict situation with other livestock, (such as a salting ground, water source, or holding corral) must, in a timely manner, be removed, buried, or otherwise disposed of such that the carcass will not attract bears or wolves. If the dead livestock is near water or designated roads, trails, or recreation sites, it would be moved at least 100 yards before being buried (permit requirement).	To prevent predators (especially grizzly bears) from becoming acclimated to the consumption of livestock	HIGH: Experience, Grizzly Bear Guidelines (1986)	Rangeland Management Specialist & Technicians, other Forest Service personnel

Mitigation Measure	Objective	Effectiveness/Rationale	Administration
Install small mammal escape ramps on all water troughs to reduce potential mortality. The ramps will be monitored by the permittee to determine if they are functioning annually	To prevent water troughs from becoming traps for small mammals, frogs, and salamanders that may fall into a water trough.	HIGH: Wildlife and Rangeland Management Specialists Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
Allotment management activities by humans will not be allowed near active wolf den sites during the denning period (late April to late June), to avoid human disturbance of the site. The distance will be determined on a site-specific basis and will depend primarily on topography around the den site.	To prevent human disturbance of wolf denning sites.	MODERATE: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
Salt and other livestock attractants will not knowingly be placed near wolf dens or rendezvous sites, to minimize cattle use of these sites. If a new den or rendezvous site is discovered, any previously established salt or attractant location may be relocated.	To prevent disturbance of wolf dens and rendezvous sites.	MODERATE: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
Install small mammal escape ramps on all water troughs to be included if Alternative 1, No Grazing, is selected	To prevent water troughs from becoming traps for small mammals, frogs, and salamanders that may fall into a water trough.	HIGH: Experience	Rangeland Management Specialist & Technicians, or other Forest Service personnel
Utilize wildlife friendly fence construction (see the Structural Range Improvement Handbook, 121.6, 7/77). The fence should be constructed to allow easier wildlife passage. Fences should be low enough for adult animals to jump, high enough for wildlife to crawl under, and minimize the chance of tangling. Recommended: a top wire or rail preferably no more than 40" and a maximum of 42" above the ground; at least 12" between the top two wires; a bottom wire or rail at least 16" and preferably 18" above the ground; smooth wire or rail for the top, smooth wire on the bottom; preferably, no vertical stays. If stays used, consider stiff plastic or composite stays, or regularly maintain wire stays that are easily bent; posts at 12 – 16.5' intervals; and gates, drop-downs, or other passages where wildlife concentrate and cross.	To allow for easier wildlife passage and minimize the chance of entanglement	MODERATE: Experience	Rangeland Management Specialist & Technicians, or other Forest Service personnel

Mitigation Measure	Objective	Effectiveness/Rationale	Administration
The permittee will report any interactions with wolves and other Threatened and Endangered Species and follow appropriate procedures outlined in the Biological Assessment, and/or Annual Operating Instructions. If a wolf den or rendezvous site is found on an allotment, the Forest Service will determine if seasonal restrictions or other requirements are necessary. Because these sites are difficult to locate and can change, this will be assessed on an ongoing basis.	Protect wolves, a State listed species, and cows	MODERATE: Experience	Rangeland Management Specialist & Technicians, Wildlife Biologist, or other Forest Service personnel
If predator control is requested by the permittee to the U.S. Fish and Wildlife Service, the permittee shall also contact the Forest Service at the same time since coordination between the permittee and the Forest Service is required by their permit.	To protect wide ranging carnivores, including Threatened, Endangered, Sensitive and Management Indicator Species	HIGH: Experience	Rangeland Management Specialist & Wildlife Biologist
Botany			
Yearly, prior to turn on onto this pasture, walk and maintain the fence around Barnell Pasture of the Tunk Allotment. If grazing is causing excessive utilization and trampling, move the livestock to another pasture.	This would protect <i>Carex media</i> from being damaged by grazing or trampling. It would also protect the habitat in the meadow.	HIGH: Experience	Rangeland Management Specialist & Technicians or other Forest Service personnel.
Work with the permittees to minimize use in the areas described below: <ul style="list-style-type: none"> The upper portion of Aeneas Creek in Section 9, T. 35 N., R. 29 E., close to road 200. The lower portion of Jungle Creek, Sections 10 & 11, T. 35 N., R. 29 E. SW ¼ of the NE ¼, Section 13, T. 35 N., R. 29 E., the wetland above the 3000292 road. Wetlands in the SE ¼ of the NW ¼, Section 21, T. 35 N., R. 29 E., and a large one in the SE ¼ east of road 3000165. Portions of Lost Creek, especially when close to the road in Sections 33 & 34, T. 35 N., R. 29 E A hanging wetland in the SE ¼ of the NW ¼, Section 	Sensitive plant species protection	HIGH: Experience	Rangeland Management Specialist & Technicians or other Forest Service personnel

Mitigation Measure	Objective	Effectiveness/Rationale	Administration
<p>29, T. 36 N., R. 29 E., on the north side of a small tributary of Peony Creek.</p> <ul style="list-style-type: none"> The upper portion of the East Fork of Peony Creek in the W 1/2 of Section 28, T. 36 N., R. 29 E 			
There is an unknown plant; it has not bloomed so identification is not possible, in the Aeneas allotment next to road 3000294. Maintain the fence around the population until the plant can be positively identified.	Sensitive plant species protection.	HIGH: Experience	Rangeland Management Specialist & Technicians or other Forest Service personnel
Cultural Resources			
Provide direction to permittees during annual meetings to protect cultural resources.	Cultural resource protection.	HIGH: Experience	Range staff or other Forest Service personnel
Do not allow vegetation on or around documented cultural resource sites to be overgrazed.	Cultural Resource protection	HIGH: Experience	Range staff or other Forest Service personnel
Range			
Salt would not be left in one place all season. All salt would be placed in the upper reaches of drainages, in the timber, on rock outcroppings, gravel pits, old closed road beds, and old logging landings. No salt would be placed in areas with noxious weeds, sensitive plant populations, or in culturally sensitive areas. Salt would be placed at least ¼ mile from meadows, wet areas, creeks and water developments and would not be placed on or near open roads, in specific dispersed campsites, or within 300 feet of trailheads or trails. Permittees would be asked to identify all salting locations each year with the assistance of the District Range Management Specialist. No salt would remain in a pasture after the cattle have moved on.	To prevent livestock from congregating in areas with noxious weeds, sensitive plant locations, culturally sensitive areas, wet areas, around campgrounds, dispersed camping sites, trailheads, or near open roads.	HIGH: Experience	Rangeland Management Specialist & Technicians, Noxious Weed Specialist, other Forest Service personnel
The permittee will count the number of cows/calves turned onto the allotments and the number taken off the allotments. If animals are unaccounted for when leaving the allotments, the permittee will notify the Forest Service immediately and make a concerted effort to locate the animals.	Permit Requirement	HIGH: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
The permittees shall mark all cows in such a way that allows for easy identification of ownership.	Permit Requirement	HIGH: Experience	Rangeland Management Specialist &

Mitigation Measure	Objective	Effectiveness/Rationale	Administration
			Technicians, other Forest Service personnel
If the herder and/or permittee are aware of or are notified that stray animals are outside the permitted area, the permittee or their agent are expected to make arrangement for retrieval of strays within 24 hours and make best efforts to find and retrieve them, and notify the Forest Service within 24 hours of their success or failure.	Permit Requirement	HIGH: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
Water rights and uses will be assessed as developed water sources are maintained, rebuilt, and developed.	State law	MODERATE: Experience	Rangeland Management Specialist & Hydrologist
Spring boxes will be inspected yearly and kept clean to ensure that water flows freely from the spring box.	To keep water developments fully functional so they are successful at drawing cattle out of riparian areas.	MODERATE: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
Spring boxes, cribs, berms, and dams will be reconstructed and maintained, as needed, to prevent leakage, downstream erosion, and minimize the risk of failure. Adequate spillways shall be developed and maintained to allow the safe release of water. If needed, spillways will be hardened to ensure that down cutting does not occur.	To keep water developments fully functional so they are successful at drawing cattle out of riparian areas.	HIGH: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
All new water developments would be installed outside of Riparian Habitat Conservation Areas (RHCAs). For existing water developments inside the RHCA, assure that the facilities do not prevent attainment of RMOs. Relocate or close facilities where these objectives cannot be met. The spring sources would be fenced off or another method will be used to protect the water source (logs, burying perforated pipe, etc.). The fences will be maintained to prevent livestock from trampling or damaging the spring sources.	To keep water developments fully functional so they are successful at drawing cattle out of riparian areas.	MODERATE: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
The spring will be piped from the box or perforated pipe, at least 100' away from the source to a trough or series of troughs to prevent livestock	To keep water developments fully functional so they are successful at drawing	HIGH: Experience	Rangeland Management Specialists & Technicians, other

Mitigation Measure	Objective	Effectiveness/Rationale	Administration
concentrations near the source. The pipe shall be buried deep enough to protect it from animals as well as from freezing or the pipe will be self-draining.	cattle out of riparian areas.		Forest Service personnel.
Troughs will be kept level and clean to prevent overflowing. Install water overflow systems and check valve systems on all water troughs to pipe excess water from the troughs back to the creek or spring. If there is overflow, the overflow shall be maintained to ensure the excess water flows through the overflow pipe and off site (usually back to the original water course).	To keep water developments fully functional so they are successful at drawing cattle out of riparian areas. To prevent water from pooling up around water troughs when there is an excess of water in the trough.	MODERATE - HIGH: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
Leaks in troughs will be fixed or new troughs will be installed to prevent water from running on the ground near the trough. Leaks in pipes will be fixed and lines will be checked to ensure that they are free of air locks.	To keep water developments fully functional so they are successful at drawing cattle out of riparian areas.	MODERATE - HIGH: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel
Spring sources will be collected into a spring box or perforated pipe. If a spring box is used, gravel will be placed behind and in the spring box to act as a filter. Spring sources will be fenced when feasible.	To keep water developments fully functional so they are successful at drawing cattle out of riparian areas.	HIGH: Experience	Rangeland Management Specialist & Technicians, other Forest Service personnel

Monitoring

Monitoring is a key component of successful management and compliance with pertinent laws and policy. Decisions regarding identifying any need to change management, and the direction that the change should take are based upon evaluation of the results of monitoring. Monitoring would target those indicators that are annually influenced by livestock grazing (implementation monitoring) and those that indicate the long term condition (effectiveness monitoring). The management objectives were developed with the most pressing issues identified for each site specific location during data collection and analysis. This was primarily developed by analyzing the departure from the existing condition and from the desired conditions.

Implementation monitoring is used to make short-term adaptive decisions regarding removal of livestock and adjustments in timing, intensity, duration, and frequency of grazing. The long term effectiveness monitoring would be used to determine if satisfactory progress is being made toward meeting the management objectives and thus the desired conditions. If not, this would inform the Range Management Specialist of the need to look at the suite of adaptive management options and adjust management strategy.

Existing Range Monitoring

Range monitoring is an on-going component of grazing permit administration. Short-term and long-term monitoring of grazing, plus coordination with other resources, is used to identify program and administrative needs. Grazing programs use monitoring to maintain or sustain ecosystem health. There are a few types of existing short-term and long-term range monitoring on these allotments. These are Condition

and Trend Range Ecology plots, Multiple Indicator Monitoring plots, and field inspections and observations recorded by Forest Service personnel.

Range inspections and observations are gathered over the life of a permit and kept in the Range files (2210 files, Tonasket Ranger District) to document grazing levels and vegetative and riparian use across the allotments. These include items such as riparian photos, and written observations by Forest Service personnel. The following describes more recent findings and management adjustments.

Monitoring livestock distribution allows the permittee (through notification or self- monitoring) to move livestock to the uplands, into natural openings, or past timber sale units away from these monitoring sites. These same points would be used for some of the additional, new, planned monitoring proposed later in this section.

Management Indicator Monitoring (MIMs)

Riparian monitoring occurs throughout the allotments*. The following areas are currently monitored for utilization and provide “trigger” data for determining the need to move livestock and will mostly be used to determine livestock movement, pasture rest, and re-allowing grazing. Current monitoring sites will be used, where possible. A Map of these sites is located in Figure S-5, Stream Monitoring Sites.

- No name Tributary 5 of Upper Aeneas (Tunk Allotment) [NE 1/4 of Sec. 15, T. 35 N., R. 29 E.]
- No name Aeneas Tributary 2 (Aeneas Allotment) [N1/2 of Sec. 13, T. 35 N., R. 29 E.]
- Upper Peony Creek at PIBO site (Tunk Allotment) [NE ¼ of Sec. 29, T. 36 N., R. 29 E.]
- Lost Creek at PIBO site (Tunk Allotment) [SE1/4 of Sec. 34 & SW1/4 of Sec. 35, T. 35 N., R. 29 E.]
- Barnell Meadows (Tunk Allotment) [SE1/4 of Sec. 27, T. 35 N., R. 29 E.]
- Patterson Creek- above 3010395 spur road (Bannon Allotment) [NW1/4 of Sec. 8, T. 36 N., R. 29 E.]
- Peony Creek at PIBO site (Bannon allotment) [NE1/4 of Sec. 21, T. 36 N., R. 29 E.]
- Upper Jungle Creek- outside fenced exclusion (Tunk Allotment) [SW ¼ of Sec. 4, T. 35 N., R. 29 E.]
- Jungle Creek Exclosure (Aeneas Allotment) [SW1/4 of Sec. 11, T. 35 N., R. 29 E.] This site would be monitored to provide a baseline for recovery time for a disturbed site (formerly the site of the Jungle Creek corral and water development) in a newly created exclosure area (this monitoring location provides a baseline site where no grazing should be taking place).

Condition and Trend

There are also existing long-term Condition and Trend Survey areas within BART allotments:

- 3 in the Bannon Allotment,
- 2 in the Aeneas Allotment, and
- 3 in the Tunk Allotment;

Riparian Monitoring Strategy

To ensure management direction is followed, as outlined in the Annual Operating Instructions (AOI, annual management instructions to the permittee), the Forest Service conducts allotment monitoring throughout the grazing season. During the development of this NEPA document, the Tonasket Ranger District has developed a monitoring strategy designed to increase effectiveness of range management and to initiate recovery of degraded riparian areas. Particularly, this plan is designed to begin improving unstable streambanks and riparian vegetation. The strategy considers ecological condition of riparian areas, aquatic habitat, and risk of direct effects to fish based on measurable conditions that affect vegetation, stream banks,

and water quality. The District will use both Implementation and Effectiveness monitoring to determine if current management is producing the desired results.

The Tonasket Ranger District has monitored annual riparian grazing use at seven riparian sites starting back in 2000. At these sites, the early monitoring was stubble height with ocular observations made on bank trampling and in 2002 monitoring switched exclusively to the percent bank alteration method. Three of the five surveys observed 30 to 40 percent bank alteration, which is above the standard of 20%. These results, coupled with documented field observation of effects to stream channel and riparian conditions, indicate changes in allotment management may be warranted. An extensive field review of the project area conducted in 2011-2012 observed extensive bank trampling and over use of riparian vegetation. The combination of these observations warrants a more rigorous monitoring plan.

A key goal of this project is to initiate riparian improvement of degraded areas while continuing active grazing. In order to achieve this goal, it is necessary to provide added protection of sensitive riparian areas by minimizing time cattle spend in these areas. The project monitoring plan would employ move triggers in addition to annual monitoring.

Proposed Allotment Monitoring Plan

Both Implementation monitoring and Effectiveness monitoring would be conducted to determine compliance with Annual Operating Instructions and resource objectives as well as be consistent with the PACFISH/INFISH RMOs, Forest Plan Standards and Guidelines, and the PACFISH/INFISH Biological Opinion (PIBO).

The BART project would rely on applicable monitoring protocols identified in the 2011 Multiple Indicator Monitoring (MIM), by Burton et al. (2011). Of the different kinds of MIMs monitoring indicators available, the Tonasket Ranger District has selected Streambank Alteration and Stubble Height for Implementation monitoring. The Tonasket Ranger District has selected photo points and channel cross-sections for Effectiveness monitoring.

Riparian monitoring will be done at nine riparian monitoring sites located across the allotments (See Figure S-5, Stream Monitoring Sites and the sites listed earlier in this section). Range, fisheries, and/or hydrology staff will conduct both Implementation and Effectiveness monitoring at these sites.

Implementation Monitoring

Implementation monitoring consists of examining stream channel and riparian vegetation indicators during the grazing season to ensure that allotment management standards are met after cattle are removed from an allotment/pasture (end of growing season). The riparian associated end-point indicators (or move triggers) identified in the PACFISH/INFISH Biological Opinion (PIBO), 2011 MIMs (Burton et al. 2011), and adopted by the Tonasket Ranger District (TRD) are stubble height - and one physical parameter - streambank alteration - to monitor current season's use of aquatic and riparian resources. These are widely used to assess the effects of livestock grazing on aquatic/riparian habitat and maintaining or achieving desired future conditions (Clary and Webster, 1989). The complete indicator standards/move triggers used are as follows:

Stream-side stubble height standard:

- Not to go below a 6-inch mean of stubble height for grasses, forbes, or sedges along the green line.

Streambank alteration standards:

- Not to exceed 20% altered banks

Move Triggers function to ensure end of season indicator standards are met and to reduce impacts in degraded riparian areas. At each riparian monitoring site, we propose to use move triggers that, if they are met the stream will maintain or move toward attainment of Riparian Management Objectives (RMOs). Each of these monitoring sites will have a combination of move triggers appropriate to site conditions.

Stubble height is a measure of the residual height of key herbaceous vegetation species remaining during or after grazing. A recent study done on the relationship of stubble height to bank alteration showed that the percentage of bank alteration decreased as the stubble height increased (Goss 2013). When trying to initiate recovery in areas with highly erodible streambanks, it is recommended to use a more strict stubble height standard of at least a 6-inch mean (Clary and Webster 1990). Therefore, the objective for stubble height would be to maintain an herbaceous stubble height of 6 inches during the grazing season and after cattle are removed. Once the herbaceous vegetation is grazed to a 6-inch mean, livestock would be moved to the next pasture or off the allotment.

Bank alteration is an annual or short-term indicator of the effect of grazing impacts on long-term streambank stability. The end-of-season percent bank alteration standard is 20%, where 80% or more of the banks would be unaltered by livestock. Stream bank stability is generally low across the project area due to over use by livestock and streambanks are highly vulnerable to bank trampling due to fine grained banks. Therefore, the proposal is to use a 15% bank alteration move trigger. This bank alteration trigger is 5% less than the indicator limit, which would ensure the end of season bank alteration value does not exceed the maximum allowed use level.

All riparian monitoring sites will be monitored during each grazing season at least once to determine if livestock use is approaching the standards. If the standards are being approached, livestock would be moved to the next pasture or off the forest. Each site will also be monitored at the end of the season to assist management in making decisions for the following year's operating instructions.

As will be identified in the AOIs, permittees are responsible for moving cattle to the next pasture if move triggers are reached. If the move trigger is not reached, cattle would be moved on the expected move dates established for each pasture.

When standards are not met or operating instructions not followed, such as excessive streambank alteration or herbaceous and shrub utilization, range and aquatic staff will work together with the permittee to further reduce impacts via management changes. For example, our range specialists will coordinate with the permittee to move livestock to other areas should in-season move triggers be met. If this is ineffective, the permittee would be issued a letter of non-compliance and non-compliance actions would be followed as outlined in Grazing Permit Handbook 2209.13 (Part 16.2b). If end of season monitoring guidelines are exceeded, alternative livestock grazing management practices (i.e. adaptive management) would be implemented for the following grazing season. Adaptive management decisions stemming from the previous season's grazing are given to the permittee in terms contained in the Annual Operating Instructions (AOIs) or annual instruction letter for the following grazing season. These decisions may consist of a reduction in time and/or numbers, additional fencing, or an adjustment of monitoring standards for future years. Multiple infractions occurring during the term of consultation may ultimately result in suspension of numbers, or cancellation of a permit as described in Part 16.2b of FSH 2209.13.

Effectiveness Monitoring

Effectiveness monitoring consists of examining trends in habitat indicators to determine if management actions are effective at improving the condition of riparian and aquatic habitats so they move towards meeting Desired Future Conditions (DFC) and Resource Management Objectives (RMOs). The monitoring

methods identified by PACFISH/INFISH Biological Opinion (PIBO), 2011 MIMs (Burton et al. 2011), and adopted by the Tonasket Ranger District (TRD) are channel cross-sections and photo point monitoring from points that can be duplicated. Effectiveness Monitoring would be done at each riparian monitoring site during the summer of 2014 as a baseline, and then at least once every 3 years. Monitoring must show a reduction of bare soiled banks and a narrowing of the stream channel as adequate amounts of riparian vegetation are left to support these processes.

The riparian monitoring sites are representative of grazing use specific to the riparian area being accessed and reflect what is happening in the overall riparian area as a result of on-the-ground management actions. The monitoring data would inform project specialists if degraded riparian and aquatic habitat conditions are improving and if current grazing regimes are consistent with the Forest Plan Standard and Guides. Additionally, this monitoring would determine the effectiveness of the different adaptive Stages of Alternative 2. Under Alternative 2, and its adaptive Stage approach, if the cross-sections and photo points show improvement (i.e. a narrowing of the channel and increased bank vegetation), the current Stage is deemed successful and it would continue. Alternatively, if the channel cross-section does not change and the existing bank condition and associated vegetation remain, the grazing strategy would proceed to the next management Stage.

Riparian Vegetation Condition Criteria for Re-grazing: Each of the potentially rested units has disturbed riparian areas where a shrub component exists. Therefore, the goal is for adequate woody vegetation to stabilize streambanks with sufficient recruitment, size classes, and species composition to withstand annual high flows and some grazing disturbance. Where shrubs occur, the following conditions should exist:

- The taller age classes should be at least 8 feet tall so they are resistant to browsing.
- Recruitment should have sufficient seedlings/suckers to larger sizes classes to maintain a diverse age/size class distribution
- There should be shrubs/trees representing two or more age/size classes
- It should be difficult to see through the stand, meaning density is high.

The project interdisciplinary team (ID Team) assesses riparian conditions using the proper functioning condition riparian vegetation checklist as described in *A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas guidance document* (Prichard et al. 1998). The team would visit a pasture proposed to be rested and determine whether the monitoring site conditions are properly functioning², functioning-at risk, or non-functioning. Following a few years of rest and annual monitoring, the team would review the monitoring site for meeting the below desired conditions.

- There is diverse age-class distribution of riparian-wetland vegetation (recruitment for maintenance/recovery);
- There is diverse composition of riparian-wetland vegetation (for maintenance/recovery);
- Species present indicate maintenance of riparian-wetland soil moisture characteristics;

² Riparian areas that exhibit a properly functioning condition are not the same as desired conditions. A properly functioning riparian is in a state of resiliency that will allow riparian-wetland area to hold together during a high-flow event, sustaining that system's ability to produce values related to both physical and biological attributes. Furthermore, it defines a condition where the riparian-wetland area is physically functioning in a manner that will allow the maintenance or recovery of desired values (e.g., fish habitat, functioning channel processes). A condition of PFC is a prerequisite to achieving desired condition.

- Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high-streamflow events;
- Riparian-wetland plants exhibit high vigor. As an example, there would be few, if any broken stems and abundant young age classes;
- Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows;

If each of above questions is answered with a “yes”, then the site is considered properly functioning and the pasture is ready for grazing. If any of the questions are answered with a “no”, the site is functioning at risk or with three or more questions answered “no”, the site is considered non-functioning for vegetation. The criteria for having suitable conditions to re-graze are properly-functioning conditions where the ID Team agrees each of the above questions is answered “yes”.

If monitoring does not show improvements from livestock management strategies described above in Stages 1 through 4 or are not protecting the continued health and function of resources or are not yielding improved riparian conditions in streams functioning at risk in the Bannan and/or Tunk allotments, in particular streambank stability, then additional adaptive management measures would be taken to reduce livestock

Other required monitoring is included in Table S-7, Monitoring, below.

Summary of Effects in Relation to Issues

Table S-8, Comparison of Alternatives, below, compares the effects of the alternatives in relation to the issues identified in Chapter 1. Table S-9, Alternative Comparison of each of the INFISH/PACFISH Riparian Management Objectives, shows a comparison for each Riparian Management Objective by alternative.

Table S - 7, Monitoring

Desired Condition	Resource Indicators from Proposed Action	Monitoring Methods and Protocol	Where	When/Frequency	Who	Correction Strategy
Range						
Livestock Trampling, soil compaction,	To check for improved water quality and soil stability near water developments	Photo at water developments fenced exclusions. Saturated soils present. Ground cover ocular estimate 100 ft. transects parallel to water. (i.e. vegetation, bare soil, rock %)	At all fenced exclosures, wet areas (if present) outside and fence lines.	Annually	Range personnel or other Forest Service personnel, permittees	Expand exclosure fence around the wet area, and continue monitoring. If the exclosure exceeds surveyed areas of BART analysis, then additional NEPA would be required.
All water development sources and developments are fully functional prior to yearly turn-on to a pasture.	Water sources protected from access by livestock, water pipelines functioning, and water developments fully functional.	Visual Inspection	All springs, water sources, and water troughs monitored annually to determine if operating effectively.	Annually	Range Management Specialists	Water sources, water developments, and water troughs will be repaired prior to turn-on each year.
All Riparian Habitat Conservation Areas are protected	Water developments such as troughs and cribs are located outside RHCAs	Visual Inspection	Riparian Habitat Conservation Areas	Annually	Range Management Specialists	Troughs located in RHCAs will be moved out of the RHCA.

Desired Condition	Resource Indicators from Proposed Action	Monitoring Methods and Protocol	Where	When/ Frequency	Who	Correction Strategy
Soils						
Soils saturation Region 6 Supplement (2500-98-1) to the FSM 2500 <u>Soil Quality Standard is to</u> Leave a minimum of 80% of an activity area in an acceptable soil quality condition.	To avoid soil compaction	Ocular inspection to insure no standing water or soils not too wet to allow grazing. (USDA protocol)	Barnell Meadows	Before livestock turn-out on years scheduled for grazing	Range personnel or other Forest Service personnel, permittees	If standing water is present, delay turn-out until field test meets 0-<10% soil moisture.
Aquatics/Hydrology						
State Water Quality standards are being met. Stream temperature and fine sediment data meeting Forest Plan and PACFISH/INFISH standards and guidelines and RMOs.	PACFISH/INFISH, RMO stream temperature and fine sediment standard WA State Water Quality standards for temperature and Forest Plan, PACFISH/INFISH RMOs for fine sediment. Okanogan National Forest, Forest Plan (1989) has a standard percent fines necessary to	Stream temperature and fine sediment monitored	At selected sites listed under Monitoring on pages S-31 and in the Aquatic Effectiveness section, above	Every 3 – 5 years	Hydrologist	If stream temperature criteria are met and fine sediment levels are reduced such that a trend can be established, then keep at current Stage, if the stream temperature and fine sediment increase then move to next Stage in Alternative 2. If this occurs in Alternative 3, livestock would be moved off that

Desired Condition	Resource Indicators from Proposed Action	Monitoring Methods and Protocol	Where	When/Frequency	Who	Correction Strategy
	<p>maintain properly functioning spawning habitat of less than 20 percent fines <1mm.</p> <p>PACFISH/INFISH water temperature standard is at or below 59 degrees within adult holding habitat, and below 48 degrees within spawning and rearing habitats (7-day moving average of daily maximum temperature, 7 day consecutive period) [INFISH RMO].</p>					pasture.
Cultural Resources						
Protection of Cultural Resources	Loss of vegetation and soil exposure	Utilization Monitoring	Areas of documented cultural resources	Annually during range inspections	Cultural Resource Technician	<p>If negative impacts from grazing are identified, the adverse effects to cultural resources would be mitigated or eliminated by amending grazing practices, authorized in the permit.</p> <p>Appropriate mitigation measures</p>

Desired Condition	Resource Indicators from Proposed Action	Monitoring Methods and Protocol	Where	When/Frequency	Who	Correction Strategy
						would be devised in consultation with SHPO, American Indian tribes, and the permittees.
Botany						
Monitor grazing impacts to Sensitive Plant Habitat	Protection of Sensitive Plant Habitat	Ocular Observation	<ul style="list-style-type: none"> Barnell Meadows Peony Pasture of the Bannon allotment, The upper portion of Aeneas Creek in Section 9, T. 35 N., R. 29 E., close to Forest Road 3000200. The lower portion of Jungle Creek in Sections 10 & 11, T. 35 N., R. 29 E. The SW1/4 of the NE1/4 of Section 13, T. 35 N., R. 29 E.; the wetland above Forest Road 3000292. A wetland in the SE ¼ of the NW ¼ of Section 21, T. 35 N., R. 29 E., and a large wetland in the SE ¼ east of road 3000165. Portions of Lost Creek, especially when close to the road, Sections 33 and 34, T.35 N., R. 29 E. A hanging wetland in 	Periodically while livestock are in these pastures.	Rangeland and Botany Management Specialist & Technicians, Aquatics and Hydrology Specialist and the permittees.	Work with the permittees to move the animals elsewhere.

Desired Condition	Resource Indicators from Proposed Action	Monitoring Methods and Protocol	Where	When/Frequency	Who	Correction Strategy
			<p>the SE ¼ of the NW1/4 of Section 29, T. 36 N., R 29 E., on the north side of a small tributary of Peony Creek.</p> <ul style="list-style-type: none"> The upper portion of the East Fork of Peony Creek in the W1/2 of Section 28, T. 36 N., R. 29 E. 			

Table S - 8, Comparison of Alternatives

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
Riparian Resources (Aquatics/Fisheries): Livestock grazing has affected riparian and aquatic ecosystems that resulted in degraded aquatic habitat and fish habitat. Livestock can directly trample stream banks, create trailing in active floodplains, and utilize riparian vegetation in a duration and intensity that destabilizes stream channels. The results of these impacts can increase floodplain, surface, and stream channel erosion, increase direct solar input to streams, thus making aquatic habitat non-functioning in its ability to support fisheries life history traits (i.e. spawning and rearing).			
Riparian vegetation conditions:	<p>The no grazing alternative would provide accelerated improvements to riparian vegetation – primarily to streambank vegetation. The entire project area would move towards meeting Forest Plan Standards and Guidelines and INFISH/PACFISH RMOs. Riparian ecosystem values would move towards a stable condition at the fastest rate of any of the alternatives.</p> <p>Riparian vegetation is expected to make substantial recovery after five years with little disturbance.</p>	<p>Alternative 2 involves an adaptive strategy approach that will vary in effects depending on how successful the early Stages are. The final Stage of this strategy would rest the same proposed four pastures as Alternative 3, if habitat conditions are proving to not meet resource objectives.</p> <p>The range of improvements in this alternative includes the following:</p> <ul style="list-style-type: none"> Negligible improvements if the early Stages are successful. Continued grazing of sensitive riparian areas would impede recovery. Existing 	<p>This alternative would provide accelerated riparian improvement to streamside vegetation in the proposed rested pastures. Riparian vegetation would move towards Forest Plan Standards and INFISH RMOs at a rapid rate in the exclusion areas. The primary management strategy is to fence off large tracks of land around riparian areas with the heaviest livestock pressure. These areas would be rested from grazing until habitat conditions reach a stable state. Riparian monitoring would determine progress in meeting resource</p>

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
	Streamside vegetation would be allowed to develop into dense shrubs, with deep roots to armor and stabilize streambanks. This would happen most quickly in areas where the canopy was open and sunlight hit the forest floor	<p>poor conditions would mostly persist for the life of the AMP.</p> <ul style="list-style-type: none"> Continued degrading trend if early Stages are unsuccessful. Duration for early Stages is at least 12 years. If early Stages are unsuccessful, Stage 5b would rest the four pastures that are not meeting resource objectives. Recovery of riparian vegetation would occur at a rapid rate in these rested pastures consistent with the no action trend. <p>In rested areas we expect a measurable increase in streamside vegetation densities that will lead to increased bank stability. Once rested, riparian vegetation would move towards Forest Plan Standards and INFISH RMOs at a rapid rate.</p> <ul style="list-style-type: none"> Riparian areas outside of the exclosures, which are functioning at risk, would improve slowly and improvements would be negligible. Continued grazing of sensitive riparian areas would impede recovery. Overall vegetation conditions would likely remain at risk for several years until watershed conditions improve. Riparian vegetation would move towards Forest Plan Standards and INFISH RMOs, but the rate would be slow and existing conditions would persist, possibly for multiple years. 	<p>standards and objectives and determine the length of time grazed pastures are used and how long pastures are rested.</p> <p>Riparian areas outside of the exclosures, which are functioning at risk, would improve slowly and overall conditions would likely remain at risk for several years until watershed conditions improve. Continued grazing of sensitive riparian areas would impede recovery. Riparian vegetation would move towards Forest Plan Standards and INFISH RMOs, but the rate would be slow and existing conditions would persist, possibly for multiple years.</p>
Streambank condition:	The no grazing alternative would provide accelerated improvement to unstable streambanks, moving the	Alternative 2 involves an adaptive strategy approach that will vary in effects depending on how successful the early Stages are.	This alternative would provide for accelerated recovery of unstable streambanks by allowing streamside

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
	<p>allotments towards meeting Forest Plan Standards and INFISH/ PACFISH RMOs throughout the project area. Bank trampling and browsing of streamside vegetation from domestic livestock would be eliminated, which would allow for streambanks to stabilize. Most aquatic and riparian ecosystem values would move towards a stable condition at the fastest rate of any of the alternatives.</p> <p>Raw, unstable streambanks would be allowed to recover over time. Unstable streambanks would decrease as vegetation became re-established on the banks that would trap additional sediment to rebuild banks naturally. Bank erosion would move towards natural rates and stream sediment levels would decrease.</p>	<p>The final Stage of this strategy would rest the same proposed four pastures as Alternative 3, if habitat conditions are proving to not meet resource objectives.</p> <p>The range of improvements in this alternative includes the following:</p> <ul style="list-style-type: none"> • Negligible improvements to bank stability if the early Stages are successful. Continued grazing along sensitive stream reaches would impede recovery. Existing poor conditions would mostly persist for multiple years or the life of the AMP. • Continued degrading streambank trend if early Stages are unsuccessful. Duration for early stages is at least 12 years. • If early Stages are unsuccessful, Stage 5b would rest the four pastures that are not meeting resource objectives. Recovery of riparian vegetation would occur at a rapid rate in these rested pastures consistent with the no action trend. <p>In rested areas we expect a measurable increase in streamside vegetation densities that will lead to a substantial improvement in bank stability. Once rested, streambanks would move towards Forest Plan Standards and INFISH RMOs at a rapid rate.</p> <ul style="list-style-type: none"> • Unstable stream reaches outside of the exclosures, which are functioning at 	<p>vegetation to re-establish and form deep roots to armor against erosive stream flows. Bank stability would move towards Forest Plan Standards and INFISH RMOs at a rapid rate in the exclusion areas. The primary management strategy is to fence off large tracks of land around riparian areas with the heaviest livestock pressure. These areas would be rested from grazing until habitat conditions reach a stable state. Riparian monitoring would determine progress in meeting resource standards and objectives and determine the length of time grazed pastures are rested.</p> <p>Unstable stream reaches outside of the exclosures, which are functioning at risk to non-functioning, would improve slowly and improvements would be negligible. Continued grazing along sensitive stream reaches would impede recovery. Overall channel conditions would likely remain at risk to non-functioning for several years until watershed conditions improve. Stream channels would move towards Forest Plan Standards and INFISH RMOs, but the rate would be slow and existing conditions would persist, possibly for multiple years.</p>

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
		<p>risk to non-functioning would improve slowly and improvements would be negligible. Continued grazing along sensitive stream reaches would impede recovery. Overall channel conditions would likely remain at risk to non-functioning for several years until watershed conditions improve. Stream channels would move towards Forest Plan Standards and INFISH RMOs, but the rate would be slow and existing conditions would persist, possibly for multiple years.</p>	
Stream sediment:	<p>Elevated stream sediment levels are primarily due to high riparian road densities and riparian grazing. Moving sediment levels to or close to meeting Forest Plan Standards and INFISH RMOs will require making substantial changes to both of these activities.</p> <p>The no grazing alternative would provide for accelerated streambank stability, which would result in substantial reductions in bank erosion and stream sedimentation. Eliminating riparian grazing pressure on streambanks would eliminate a major source of stream sedimentation. Stream sediment levels would make a substantial shift towards Forest Plan Standards and INFISH RMOs, but would not reach them without reducing impacts from roads. All streams with bank trampling would move towards a</p>	<p>Alternative 2 involves an adaptive strategy approach that will vary in effects on streambank erosion rates and sediment levels, depending on how successful the early stages are. The final stage of this strategy would rest the same proposed four pastures as Alternative 3, if habitat conditions are proving to not meet resource objectives.</p> <p>Elevated stream sediment levels are primarily due to high riparian road densities and riparian grazing. Moving sediment levels to or close to meeting Forest Plan Standards and INFISH RMOs will require making substantial changes to both of these activities.</p> <p>The range of improvements in this alternative includes the following:</p> <ul style="list-style-type: none"> • Negligible improvement to bank stability and stream sediment levels if the early stages are successful. Continued grazing along sensitive 	<p>This alternative would provide for accelerated recovery of unstable streambanks by allowing streamside vegetation to re-establish and form deep roots to armor against erosive stream flows. Bank erosion rates would improve substantially in the heaviest use areas, which would move stream sediment levels towards Forest Plan Standards and INFISH RMOs. However, the existing riparian road network would impede full recovery of stream sediment levels.</p> <p>Unstable stream reaches outside of the exclosures, which are functioning at risk to non-functioning, would improve slowly and improvements to stream sediment levels would be negligible. Continued grazing along sensitive stream reaches would impede recovery. Cattle would continue to cause bank erosion and sediment delivery. Riparian roads</p>

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
	<p>more functioning state at the fastest rate of any of the alternatives</p>	<p>stream reaches would impede recovery. Cattle would continue to cause bank erosion and sediment delivery. Riparian roads would also contribute to excess sediment in streams. Existing poor conditions would mostly persist for multiple years or the life of AMP.</p> <ul style="list-style-type: none"> Continued degrading sedimentation trend if early stages are unsuccessful. Duration for early stages is at least 12 years. If early stages are unsuccessful, Stage 5b would rest the four pastures that are not meeting resource objectives. Recovery of streambank stability and a reduction in bank erosion rates would occur at a rapid rate in these rested pastures consistent with the no action trend. <p>In rested areas we expect a measureable decrease in unstable banks that would lead to less sediment delivery. Fine sediment levels would improve in the rested streams and larger streams below. Improvements to stream sediment levels may be substantial enough to be measurable. Stream sediment levels would move towards Forest Plan Standards and INFISH RMOs. However, the existing riparian road network would impede full recovery of stream sediment levels.</p> <p>Unstable stream reaches outside of the exclosures, which are functioning at risk to non-functioning, would improve slowly and</p>	<p>would also contribute to excess sediment in streams. Overall channel conditions would likely remain at risk to non-functioning for several years until watershed conditions improve. Stream sediment levels in these areas would move towards Forest Plan Standards and INFISH RMOs, but the rate would be slow and existing conditions would persist, possibly for multiple years.</p>

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
		improvements to stream sediment levels would be negligible. Continued grazing along sensitive stream reaches would impede recovery. Cattle would continue to cause bank erosion and sediment delivery. Riparian roads would also contribute to excess sediment in streams. Overall channel conditions would likely remain at risk to non-functioning for several years until watershed conditions improve. Stream sediment levels in these areas would move towards Forest Plan Standards and INFISH RMOs, but the rate would be slow and existing conditions would persist, possibly for multiple years.	
Hydrology: Livestock grazing has affected riparian and aquatic ecosystems by disturbing streambanks, removing streamside vegetation, and increasing bank erosion, thus adversely affecting hydrologic function, fish habitat, and other aspects of the aquatic ecosystem.			
Riparian vegetation conditions (bare soil):	<p>The no grazing alternative would provide accelerated aquatic/riparian resource improvement – primarily to stream bank and streamside vegetation and bank stability, moving the allotments towards meeting Forest Plan Standards and Guidelines and INFISH/PACFISH RMOs throughout the project area. Bank trampling and browsing would be eliminated. Most aquatic and riparian ecosystem values would move towards a stable condition at the fastest rate of any of the alternatives.</p> <p>Cattle impacts would be removed after two years. The bare soil areas in the stream bottoms would be allowed to recover over time. The bare soil area would decrease as</p>	<p>Alternative 2 may result in minor improvements to streambank stability, riparian vegetation, and fine sediment, but with continued riparian grazing, improvements would be minor and not measurable. If Stage 5b is implemented and large areas are rested, recovery in these areas would occur at a fast rate and bank stability and riparian vegetation conditions would improve. Due to the widespread instability, poor channel conditions of the allotment streams, and the extensive road network, improvements to erosion rates and stream sediment levels may not measurably improve under 5b.</p> <p>In rested areas we expect a measureable increase in bank stability and possibly a measurable decrease in fine sediment levels in riparian areas that are rested.</p>	<p>This alternative would provide accelerated riparian resource improvement- primarily to stream bank stability and streamside vegetation would move towards Forest Plan Standards and INFISH RMOs in the exclusion areas. The primary management strategy is to fence off large tracks of land around streams with the heaviest bank trampling. These areas would be rested from grazing until habitat conditions reach a stable state. Riparian monitoring would determine progress in meeting resource standards and objectives and determine the length of time grazed pastures are used and how long pastures are rested.</p> <p>Outside of exclusion areas, conditions</p>

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
	vegetation became re-established on the stream banks. This would happen most quickly in areas where the canopy was open and sunlight hit the forest floor.	<p>Outside of rested areas, conditions may improve or may not. Some areas will receive more grazing pressure with fewer streams accessible, leading to greater impacts. On the other hand, improved grazing management may reduce use across the allotment, leading to improved conditions. Areas with poor channel and riparian vegetation conditions along streams and wetlands may improve slightly, but it's expected to be minor and not measurable because continuing to graze vulnerable areas would hinder recovery. Degraded vegetation conditions would either remain or have a very slow improvement trend. Physical stream features like fine sediment levels, width/depth ratios, and pool frequencies are unlikely to achieve DFC until a significant reduction in riparian roads occurs and years pass by for conifers to reach maturity. Fine sediment levels and riparian vegetation conditions may continue to deteriorate without rest.</p> <p>Permittees would have a larger role in the decision to implement adaptive management measures that would cause some pastures to be rested.</p>	may improve or may not. Some areas will receive more grazing pressure with fewer streams accessible, leading to greater impacts. On the other hand, improved grazing management may reduce use across the allotment, leading to improved conditions. Areas with poor channel and riparian vegetation conditions along streams and wetlands may improve slightly, but it's expected to be minor and not measurable because continuing to graze vulnerable areas would hinder recovery. Degraded vegetation conditions would either remain or have a very slow improving trend. Physical stream features like fine sediment levels, width/depth ratios, and pool frequencies are unlikely to achieve DFC until a significant reduction in riparian roads occurs and years pass by for conifers to reach maturity, fine sediment levels and riparian vegetation conditions may continue to deteriorate without rest.
Sediment (turbidity as surrogate):	See Aquatics/Fisheries section above.	See Aquatics/Fisheries section above.	See Aquatics/Fisheries section above.
Temperature	See discussion directly below under Hydrology (Water Quality).	See discussion directly below under Hydrology (Water Quality).	See discussion directly below under Hydrology (Water Quality).
Hydrology (Water Quality): Grazing has the potential to indirectly affect beneficial uses and 303(d) listed waterbodies for the pollutants of nutrients, bacteria, and temperature.			
Expected trend for <i>E. coli</i> bacteria in project area streams:	With the removal of grazing, fecal coliform levels in surface waters in the analysis area would decrease and	Range practices may directly increase fecal coliform levels in surface water. However, water monitoring of selected areas of	Range practices may directly increase fecal coliform levels in surface water. However, water monitoring of

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
	would stay below Washington State standards.	grazing have not shown a significant problem (Bennett, 1982). Past water monitoring projects suggest fecal coliform levels increase to levels near the Washington State standards but quickly fall to background levels within one to two miles below the stock concentration. The stream environment is harsh for coliform organisms because temperatures are cool in reaches where adequate shade is provided by riparian vegetation and forest canopy. Other harmful organisms may or may not survive farther downstream. Where riparian shade is not provided, warmer water temperatures may persist in the heat of summer and may support coliform communities.	selected areas of grazing have not shown a significant problem (Bennett, 1982). Past water monitoring projects suggest fecal coliform levels increase to levels near the Washington State standards but quickly fall to background levels within one to two miles below the stock concentration. The stream environment is harsh for coliform organisms because temperatures are cool in reaches where adequate shade is provided by riparian vegetation and forest canopy. Other harmful organisms may or may not survive farther downstream. Where riparian shade is not provided, warmer water temperatures may persist in the heat of summer and may support coliform communities.
Expected trend for temperature in project area streams:	Baseline stream temperatures are considered properly functioning across the allotments. Overstory conifers provide adequate shade over most streams, which are unaffected by livestock. There would be some increase in stream shade levels where shrubs and hardwoods could mature and provide an additional shade layer. This alternative would result in some increase in shade and a slight, immeasurable, improvement in stream temperature.	<p>Baseline stream temperatures are considered properly functioning across the allotments. Mature and late seral conifers provide a majority of the shade levels for most streams, which are unaffected by livestock.</p> <p>Water developments have the potential to affect stream temperature by bringing groundwater to the surface and exposing it to solar warming and decreasing the volume of water in streams. This proportionally small volume effect to the overall hydrologic budget at each site would not result in sufficient reductions to the drainages to effect measurable changes in water temperature.</p> <p>Stage 5 would result in a slight</p>	Baseline stream temperatures are considered properly functioning across the allotments. Shade levels for most streams are providing adequate shade with conifers providing the overstory canopy, which are unaffected by livestock. This alternative is not expected to reduce shade levels and the existing functioning stream temperatures would remain.

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
		improvement in stream shade levels that may have some localized improvements in stream temperature, but it would be an immeasurable improvement.	
Economic Impacts to Permittee and Community, and Efficiency of Management: Communities in Okanogan County have historical ties to agriculture. For many residents, ranching is more than just a form of employment; it is a way of life and supports long-standing family traditions. Livestock grazing has economic and social importance to these communities. These allotments support agricultural jobs and income as well as the ranching way of life for many families. A reduction of AUMs will cause a negative economic impact to the economy of Okanogan County.			
Number of jobs created:	No jobs created, estimated 16 jobs lost. Retained labor income of approximately \$251,392 lost.	Estimated 16 jobs retained. Retained labor income of approximately \$251,392. This could be reduced in Stage 5b if rest of the 5 pastures (A, B, C, D, and Peony Creek) is required.	Estimated 16 jobs retained. Retained labor income of approximately \$251,392. This would be reduced as grazing fees are reduced due to lower permitted numbers of livestock with pastures not being available for grazing or reduced seasons of use.
Costs of range improvements:	No cost of range improvements since none will be installed. Some possibility of salvage of some of the range improvements for use elsewhere.	Total range improvement costs would be as little as \$74,463 (Stage 1) or as high as \$206,083 if all stages implemented.	Total range improvement costs estimated at \$206,083 (\$74,465 year 1; \$45,786 year 2; \$37,568 year 3; and \$47,664 year 4).
Acres available for grazing:	No acres available for grazing after 2 years for permit termination.	Loss of acres available for grazing would be an estimated 594 acres in Stage 1. If Stage 5b was fully implemented (rest) total acres rested would be about 8,000 acres or 22% of the allotments. Permittees would have a larger role in the decision to implement adaptive management measures that would cause some pastures to be rested.	Loss of acres available for grazing would be an estimated 594 acres in year 1. Year 2 would add an additional 3,447 acres of rest; Year 3 would add an additional 1,630 acres of rest, and year 4 would add an additional 2,300 acres of rest or a total estimated area of 8,000 acres, or about 22% of the allotment.
Average days/months on allotments:	No grazing allowed after 2 years for permit termination.	Normal season of use is June 1 to September 30 th ; 4 months.	Normal season of use is June 1 to September 30 th ; 4 months.
Number of head months or AUMs on allotments:	No grazing allowed on the allotments after 2 years for permit termination.	Up to the following Head Months (AUMs) Bannon = 602 HM (806 AUMs), Aeneas=1203 HM (1610 AUMs), Revis=32 HM (43 AUMs), and Tunk=1556 HM (2083 AUMs). As the area of rested pasture increases, the number of head	Up to the following Head Months (AUMs) Bannon = 602 HM (806 AUMs), Aeneas=1203 HM (1610 AUMs), Revis=32 HM (43 AUMs), and Tunk=1556 HM (2083 AUMs). As the area of rested pasture

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
		<p>months/AUMs could be reduced if all 5 pastures are rested (Peony, Area A, B, C, and D) or the grazing season could be shortened.</p> <p>The permittees would have a greater role in determining if rest, reduction of HM/AUMs, is implemented.</p>	<p>increases, the number of head months/AUMs could be reduced when all 5 pastures are rested (Peony, Area A, B, C, and D) or the grazing season could be shortened. This decrease could be expected over about a 4 year period and could be expected to last from 5 years to greater than 10 years.</p>
Grazing fees received by the U.S. Treasury:	No payments based on grazing fees off National Forest System (NFS) land would be received by the Treasury for the BART allotments. No costs would be incurred for range betterment expenses.	Estimated payments of grazing fees off NFS land received by the Treasury would be \$4,580 (25% of fees collected) on the BART allotments. This could be reduced in Stage 5b if rest of the 5 pastures (A, B, C, D, and Peony Creek) is required due to lower permitted numbers of livestock with pastures not being available for grazing or reduced seasons of use.	Estimated payments of grazing fees off NFS land received by the Treasury would be \$4,580 (25% of fees collected) for the BART allotments. This could be reduced as grazing fees are reduced due to lower permitted numbers of livestock with pastures not being available for grazing or reduced seasons of use.
Payments to the 25 Percent Fund:	No payments based on grazing fees off National Forest System (NFS) lands would be received by Okanogan County for the BART allotments	Estimated payments based on grazing fees off NFS land received by the 25 Percent Fund would be \$4,580 (25% of fees collected) for the BART allotments. This could be reduced in Stage 5 if rest of the 5 pastures (A, B, C, and D and Peony Creek) is required due to lower permitted numbers of livestock with pastures not being available for grazing or reduced season of use.	Estimated payments based on grazing fees off NFS land received by the 25 Percent Fund would be \$4,580 (25% of fees collected) for the BART allotments. This could be reduced as grazing fees are reduced due to lower permitted numbers of livestock or a reduced grazing season with pastures not being available for grazing.
Economic Impacts to Permittee and Community, and Efficiency of Management: Smaller pastures will require the movement of cattle by the permittee more often at times of the year when cattle are difficult to find and move.			
Number of pastures (movement of cattle):	No grazing allowed after 2 years for permit termination.	There would be up 13 separate pastures. The Peony pasture would be rested under Stage 1. Under the fifth stage, depending on monitoring outcomes, up to 5 pastures could be rested (Peony and Areas A, B, C, and/or D) until triggers are met to return grazing to one, or more of these 5 pastures. In addition, the Barnell/Lost pasture would	There would be up to 13 separate pastures. The Peony pasture would be rested the first year; up to 2 pastures would be rested the second year (Peony and Area C); up to 3 pastures the third year (Peony, Area C and D); and up to 5 pastures rested the fourth year and beyond for a period of

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
		<p>only be grazed on a limited basis on alternative years, for a reduced period of time, until triggers are reached to return full grazing to this pasture.</p> <p>Permittees would have a larger role in the decision to implement adaptive management measures that would cause some pastures to be rested.</p>	<p>time (Peony and Areas A, B, C, and D) until the triggers are met to return grazing to those pastures. In addition, the Barnell/Lost pasture would only be grazed on a limited basis on alternative years, for a reduced period of time, until triggers are reached to return full grazing to this pasture.</p>
Wildlife: Additional fencing can create significant barriers or impediments to normal movement and increase energy demands for wildlife.			
Miles of fence removed:	No fences removed. There would be some possibility to salvage some of the fence materials for reuse or sale.	Approximately 1.1 miles of fence would be removed between the Revis and Bannon pastures. About 0.6 miles of fence would be removed from the Barnell Meadows area.	Approximately 1.1 miles of fence would be removed between the Revis and Bannon pastures. About 0.6 miles of fence would be removed from the Barnell Meadows area.
Miles of potential additional fencing:	There would be no potential of additional fencing since no grazing would be allowed after the 2 years for permit termination.	<p>About 2.5 miles of fence would be constructed or moved during Stage 1 implementation; while, up to, an additional 11.1 miles could be constructed, only as needed, based on monitoring results.</p> <p>Permittees would have a larger role in the decision of what fences would be built in Stages 2, 3, and 4.</p>	About 2.5 miles of fence would be constructed or moved during Stage 1 implementation. While an additional 11.1 miles (Stage 2=3.9 miles, Stage 3=3.2 miles, and Stage 4=4.0 miles [2 fences]) would be built.
Design elements to reduce impacts:	Livestock would not be present to disturb wildlife, nor would the associated human presence due to livestock management activities. Existing range improvements would be left to deteriorate. This means water troughs would not have their wildlife escape ramps maintained and consequently there would be an increased danger of small animals drowning. Also, there would be a risk of wildlife entanglement in the fence wire as the fences deteriorate.	This alternative would reduce the stressors by exotic herbivores. Stressors such as shrub hedging hardwood browsing, and riparian vegetation trampling can be reduced if domestic cattle are managed with added range improvements. These improvements would help the permittees control grazing pastures and lead to more resiliency throughout all habitats for native species in all the allotments. The added 13.6 miles of new fencing, or moved fencing, would have a slight negative impact on wildlife and their movement	This alternative would reduce the stressors by exotic herbivores. Stressors such as shrub hedging hardwood browsing, and riparian vegetation trampling can be reduced if domestic cattle are managed with added range improvements. These improvements would help the permittees control grazing pastures and lead to more resiliency throughout all habitats for native species in all the allotments. The added 13.6 miles of new fencing, or

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
		because of the added entanglement possibilities but with proper maintenance these chances decrease dramatically.	moved fencing, would have a slight negative impact on wildlife and their movement because of the added entanglement possibilities but with proper maintenance these chances decrease dramatically.
Wildlife: Grazing effects the habitat of threatened, endangered, and sensitive (TES) wildlife species, migratory birds (MB), and Management Indicator Species (MIS).			
Impacts to threatened, endangered, and sensitive (TES) wildlife species, migratory birds (MB), management indicator species (MIS), and the associated habitats:	Eliminating grazing by non-native herbivores would allow 100% of forage and habitat to be utilized by wildlife.	<p>Livestock grazing effects on habitat could affect some wildlife species or habitats primarily through disturbance and displacement of wildlife species and by altering vegetation and habitat conditions.</p> <p>Suitable habitat for several TES, MB, and MIS species exists throughout the allotments.</p>	<p>Livestock grazing effects on habitat could affect some wildlife species or habitats primarily through disturbance and displacement of wildlife species and by altering vegetation and habitat conditions.</p> <p>Suitable habitat for several TES, MB, and MIS species exists throughout the allotments.</p>
Soil Productivity: Livestock grazing may affect long term soil productivity by reducing effective ground cover and increasing surface erosion			
Percent effective ground cover:	With the removal of grazing, no adverse impacts to soil resources attributable to livestock grazing would occur within the analysis areas. Recovery of existing detrimental soil conditions due to past and current grazing management would occur through natural means (e.g. freeze/thaw cycles, root penetration into compacted soils, etc.).	<p>Improvements would occur in localized areas where livestock are excluded or their use is substantially reduced.</p> <p>Maintenance of current stocking levels and the season of use would result in effects similar to what is seen with the existing condition. There would be no improvement to soil resources with this action. The overall condition of the soil resource is expected to either be maintained or further degraded depending on location within the allotments. For instance, upland soils would likely continue to see very little grazing pressure and should maintain themselves in stable condition. Streambank soils would likely continue to see very heavy grazing pressure and should continue to decline in condition as constant trampling in these</p>	<p>Improvements would occur in localized areas where livestock are excluded or their use is substantially reduced.</p> <p>Maintenance of current stocking levels and the season of use would result in effects similar to what is seen with the existing condition. There would be no improvement to soil resources with this action outside of rested areas. The overall condition of the soil resource is expected to either be maintained or further degraded depending on location within the allotments. For instance, upland soils would likely continue to see very little grazing pressure and should maintain themselves in stable condition.</p>

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
		<p>areas inhibits any potential recovery.</p> <p>In rested pastures, recovery of existing detrimental soil conditions due to past and current grazing management would occur through natural means (e.g. freeze/thaw cycles, root penetration into compacted soils, etc.).</p>	<p>Streambank soils, where not rested, would likely continue to see very heavy grazing pressure and should continue to decline in condition as constant trampling in these areas inhibits any potential recovery.</p> <p>In rested pastures, recovery of existing detrimental soil conditions due to past and current grazing management would occur through natural means (e.g. freeze/thaw cycles, root penetration into compacted soils, etc.).</p>
Estimated soil erosion:	With the removal of grazing, no adverse impacts to soil resources attributable to livestock grazing would occur within the analysis areas. Recovery of existing detrimental soil conditions due to past and current grazing management would occur through natural means (e.g. freeze/thaw cycles, root penetration into compacted soils, etc.).	Due to the widespread instability, poor conditions of the allotment streams, and the extensive road network, improvements to erosion rates would not measurably improve habitat conditions.	Due to the widespread instability, poor conditions of the allotment streams, and the extensive road network, improvements to erosion rates would not measurably improve habitat conditions outside of rested pastures.
Number of isolated areas of impact where trend is not maintained or improved:	With the removal of grazing, no adverse impacts to soil resources attributable to livestock grazing would occur within the analysis areas. Recovery of existing detrimental soil conditions due to past and current grazing management would occur through natural means (e.g. freeze/thaw cycles, root penetration into compacted soils, etc.).	<p>Improvements would occur in localized areas where livestock are excluded or their use is substantially reduced. The reduction in impacts would have a positive impact on localized conditions of the analysis area, but other areas would likely not improve during the life of this AMP. Overall, the project would move the analysis area in an improved trajectory, but only slightly when considering areas rested and areas with continued grazing.</p> <p>We expect a measureable increase in bank</p>	Improvements would occur in localized areas where livestock are excluded or their use is substantially reduced. The reduction in impacts would have a positive impact on localized conditions of the analysis area, but other areas would likely not improve during the life of this AMP. Overall, the project would move the analysis area in an improved trajectory, but only slightly when considering areas rested and areas with continued grazing.

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
		stability and possibly a measurable decrease in fine sediment levels in the areas rested. Outside of rested areas, conditions may improve, but not substantially.	We expect a measureable increase in bank stability and possibly a measurable decrease in fine sediment levels in the areas rested. Outside of rested areas, conditions may improve, but not substantially.
Invasive Species: Ground-disturbing activities associated with livestock grazing can create opportunities for the establishment of invasive weed infestations, which may result in increased invasive weed populations.			
Number, location, and extent of new infestations in areas used by livestock that are detected while infestations are manageable; i.e. discovered when size and density of the infestation are small enough that they can be eradicated or controlled to prevent further spread:	There would be no soil disturbance from cattle. There would be no spread of invasive species by livestock. Native vegetation would be free to grow and compete with noxious weeds. Potential for new populations of noxious weeds would be reduced. There would be less potential for noxious weeds to establish. There would be fewer opportunities for early detection because there would be no permittees making observations. Increases in ungrazed grasses can increase the risk of wildfire spread which could result in an increase in noxious weeds	Soil disturbance would occur. Spread of some weeds by cattle would still occur, e.g. hound's tongue. Existing vegetation would be grazed, but water developments, a fence, and other range improvements would better manage and disperse cattle. There would be less concentration and over utilization of certain areas, pastures can be rested. Native vegetation could better compete with noxious weeds and limit infestations Reduced concentration of livestock would reduce the amount of ground disturbance	Soil disturbance would occur. Spread of some weeds by cattle would still occur, e.g. hound's tongue. Existing vegetation would be grazed, but installation of multiple fences and other range improvements would better manage and disperse cattle. There would be less concentration and over utilization, pastures can be rested. Native vegetation could better compete with noxious weeds and limit infestations. Limiting concentration of livestock would reduce the amount of ground disturbance.
Range Resources: Livestock grazing may affect rangeland and riparian vegetation health by altering plant community composition and structure.			
Percent and type of vegetation cover and composition relative to desirable and native plant communities:	The No Grazing Alternative would provide short term accelerated improvement to riparian vegetation. Since no grazing would occur, no monitoring of the MIM (PIBO) would occur or photo plots to document this. This Alternative would not differ in rate of upland vegetation improvement between any of the	This alternative is expected to provide some improvement to riparian vegetation, more slowly than Alt 1 and Alt 3. The changes between rates in Alternative 2 & 3 are difficult to specifically predict given the use of adaptive management options a permittee is allowed to utilize to achieve desired resource results. The MIM implementation monitoring is short term, and would only indicate short	This alternative would provide improvement to riparian vegetation, slightly more slowly than Alt 1 and a little more rapidly than Alt 2. The changes between rates in Alternative 2 & 3 are difficult to specifically predict given the use of adaptive management options a permittee is allowed to utilize to achieve desired resource results.

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
	<p>Alternatives. This is because the uplands have already been identified in a desirable or upward trend.</p> <p>These statements assume there is no establishment or spread by invasive plant species into either riparian or upland sites.</p>	<p>term changes to vegetation, annual use on soils, or bare ground measurement. Associated photos and notes may indicate percentage of plant species composition. MIM monitoring of streambank stability would identify short term changes in bare soil.</p> <p>C&T (Condition and Trend) Long Term plots established in Upland Vegetation types will continue to monitor the stable and/or upward trend of plant species composition and desirable ground cover (low percentage bare soil).</p> <p>These statements assume there is no establishment or spread by invasive plant species into either riparian or upland sites.</p>	<p>The MIM implementation monitoring is short term, and would indicate short term changes to vegetation, annual use on soils, and bare ground measurements. Associated photos and notes may indicate percentage of plant species composition.</p> <p>C&T (Condition and Trend) Long Term plots established in Upland Vegetation types will continue to monitor the stable and/or upward trend of plant species composition and desirable ground cover (low percentage bare soil).</p> <p>These statements assume there is no establishment or spread by invasive plant species into either riparian or upland sites.</p>
Recreation: Permitted domestic cattle livestock grazing may conflict with recreational use of camping areas.			
Evidence of domestic cattle livestock activity in camping areas used for recreation:	There would be no evidence of domestic cattle activity in/on camping areas and trails used for recreation since all cattle, except trespass animals, would be removed from the BART allotments.	The recreation fences around Crawfish Lake and the Aeneas Springs dispersed camping site would continue to need maintenance to keep cows out of those recreation sites. Cattle would still be able to access the other dispersed sites and trails.	The recreation fences around Crawfish Lake and the Aeneas Springs dispersed camping site would continue to need maintenance to keep cows out of those recreation sites. Cattle would still be able to access the other dispersed sites and trails.
Threatened, Endangered, and Sensitive Plant Species (Botany): Livestock can affect sensitive and native plants by grazing or trampling. Some plants of cultural interest to local Indian tribes may be grazed or trampled.			
<p>Trampling and grazing around TESP and cultural plant populations:</p> <p>Decrease of trampling and grazing of sensitive species and habitat:</p>	The sensitive species <i>Carex media</i> , <i>Coeloglossum viride</i> , <i>Platanthera obtusata</i> , and <i>Viola renifolia</i> may benefit from no trampling or grazing of plants and habitat. However, there may be more competition for sensitive plants from other vegetation	Trampling and grazing may occur to sensitive species and their habitat. However range improvements such as water developments, a fence, and an extra pasture would better manage and help disperse cattle away from these populations.	Trampling and grazing may occur to sensitive species and their habitat. However range improvements such as water developments, extra pastures, and a number of fences would better manage and disperse cattle away from these species.

Issue/Indicator	Alternative 1, No Grazing	Alternative 2, Proposed Action	Alternative 3
Percent and type of vegetation cover and composition that is maintained or increasing:	that is not grazed. Cultural plants such as Yampah and Thimbleberry are expected to maintain themselves, although there would be extra competition from other vegetation.	There would be less competition from other vegetation that is grazed. If necessary, extra fences would be built to manage cattle, further reducing impacts to sensitive species and habitat. Palatable cultural plants such as Yampah are expected to maintain themselves, although there would be grazing and trampling. Grazing would also reduce associated vegetation, resulting in less competition for cultural plants.	There would be less competition from other vegetation that is grazed. Palatable cultural plants such as Yampah are expected to maintain themselves, although there would be grazing and trampling. Grazing would also reduce associated vegetation, resulting in less competition for cultural plants.
Cultural Resources: Livestock may damage cultural resources. The heritage program conducted cultural resource inventories within the boundaries of these allotments. These surveys identified numerous cultural resources which are eligible for listing on the National Register of Historic Places.			
Damage to cultural resources:	The impacts from no grazing will be less than an action alternative, but not much less.	This project received a “No Adverse Effect” determination from SHPO. Effects are small and cultural resources will be protected through mitigation and monitoring.	This project received a “No Adverse Effect” determination from SHPO. Effects are small and cultural resources will be protected through mitigation and monitoring.
Climate Change Effects to Wildlife: As the climate changes, the resiliency of these forest stands would be important for maintaining biodiversity and allowing these stands and species a chance to adapt to the new conditions.			
Livestock grazing effect on biodiversity:	There would be no livestock effect if they are not present in the allotments.	The proposed livestock grazing would have a neutral outcome on the resiliency of the analysis area related to climate change.	The proposed grazing would have a neutral outcome on the resiliency of the analysis area related to climate change.
Wildlife Corridors: The analysis area has been identified as the only modeled linkage through the Okanogan Valley that was consistently identified for all focal species of carnivores.			
Livestock grazing effect on wildlife corridors for focal species of carnivores:	There would be no livestock effect if they are not present in the allotments.	Livestock grazing will not negatively affect the forested stand cover in the analysis area. Annual available browse for wildlife and domestic livestock would be maintained at Forest Plan standards and guidelines based on the appropriate management area. Overall, the BART grazing analysis will not impact the function of these corridors.	Livestock grazing will not negatively affect the forested stand cover in the analysis area. Annual available browse for wildlife and domestic livestock would be maintained at Forest Plan standards and guidelines based on the appropriate management area. Overall, the BART grazing analysis will not impact the function of these corridors.

Table S - 9, Alternative Comparison of each of the INFISH/PACFISH Riparian Management Objectives

Riparian Management Objective (RMO)	Alternative One – No grazing	Alternative 2 and 3
Pool Frequency 47 pools/mi.	Bank erosion would be substantially reduced across the entire project area with no grazing. Current fine sediment delivery from livestock appears to be substantial and with all riparian grazing stopped, fine sediment delivery to streams would see a marked decrease. This would reduce pool infilling over time; however, changes in pool frequency can take decades, or longer, to improve when rested from grazing. High road densities would continue to supply excess sediment to the stream network that would hinder pool recovery. Pool frequency is unlikely to change much in the life of the proposed Allotment Management Plan (AMP)	Bank erosion would be reduced across where riparian grazing is excluded or rested. Where grazing is allowed along streams, fine sediment delivery would continue. Grazing impacts coupled with sediment from roads would substantially hinder any increase in pool frequencies from continued excess sediment put into stream networks. Pool frequencies are unlikely to change at all over the life of the AMPs.
Water Temperature 59/60° F., or less	Temperatures would remain unchanged	Existing grazing does not appear to be affecting water temperatures. The two action alternatives would reduce impacts to riparian vegetation, thereby improving stream shading to some degree. Existing conditions would be maintained.
Large Woody Debris (LWD) >20 pieces per mile, 12” diameter at the small end and >35’ in length	Most streams have sufficient LWD levels. Areas with lower levels are partly due to human factors like past timber harvest. RHCAs have been, and will continue to be protected for natural wood recruitment. Conditions would remain unchanged under this alternative.	Grazing would not affect wood levels in streams. Each action alternative would protect instream wood levels.
Width to Depth Ratio ,10 (mean wetted Width divided By mean depth)	Currently some reaches of streams in the analysis area are not within the 10:1 ratio due to excessive fine sediment loads in streams from natural conditions and from roads, past logging, and riparian grazing. With no streamside grazing, banks would stabilize and bank erosion from livestock would stop. This would lead to streams stabilizing and a substantial reduction in fine sediment delivery. This would increase channel stability and allow channels to rebuild natural banks and move towards narrower and deeper channels. However, changes in width/depth ratios can take decades, or longer, to improve when rested from grazing. The high volume of riparian roads, fine sediment levels would continue to be elevated that would hinder wide, shallow channels from narrowing. This alternative would move conditions in a restorative direction, but the riparian roads would prevent full recovery.	Rested areas would begin to recover and wide channels would begin to narrow over time. Areas with continued grazing would not likely change much. This alternative would move conditions in a restorative direction in rested areas, but the riparian roads would prevent full recovery.

Riparian Management Objective (RMO)	Alternative One – No grazing	Alternative 2 and 3
Bank Stability (non-forested Systems) > 80% stable	Bank stability would improve in Lost and Barnell Creek, likely exceeding the Resource Management Objective (RMO) standard. From the literature, bank stability in meadow streams with sedges, rushes, and willows exceeds 90% in natural systems. Conditions would improve and bank stability would likely reach up to 90%.	Under each action alternative, the meadow portions of Lost and Barnell Creeks would be rested every other year and only grazed for 2 to 3 weeks on the grazed years. Conditions would likely improve in the unstable areas slowly. Conditions are expected to move towards meeting RMO standards.
Lower Bank Angle >75% Of banks with <90° angle (i.e. undercut) [non-forested systems]	There are reaches in both Barnell and Lost Creeks with vertical banks and signs of channel downcutting. This is due to a host of factors like riparian grazing and altered runoff patterns from roads and timber harvest. Resting these streams would allow streambank vegetation to establish at full capacity. Changes to this habitat feature are likely to take decades or longer before banks establish more undercut banks. It is unknown if these streams are meeting the standard or not with confidence, but it's suspected to not meet it. This alternative would move the streambank towards meeting this RMO standard.	Under each action alternative, the meadow portions of Lost and Barnell Creek would be rested every other year and only grazed for 2 – 3 weeks on the grazed year. Conditions would likely improve in the unstable areas slowly. Conditions are expected to move towards meeting RMO standards, but slower than Alternative 1.

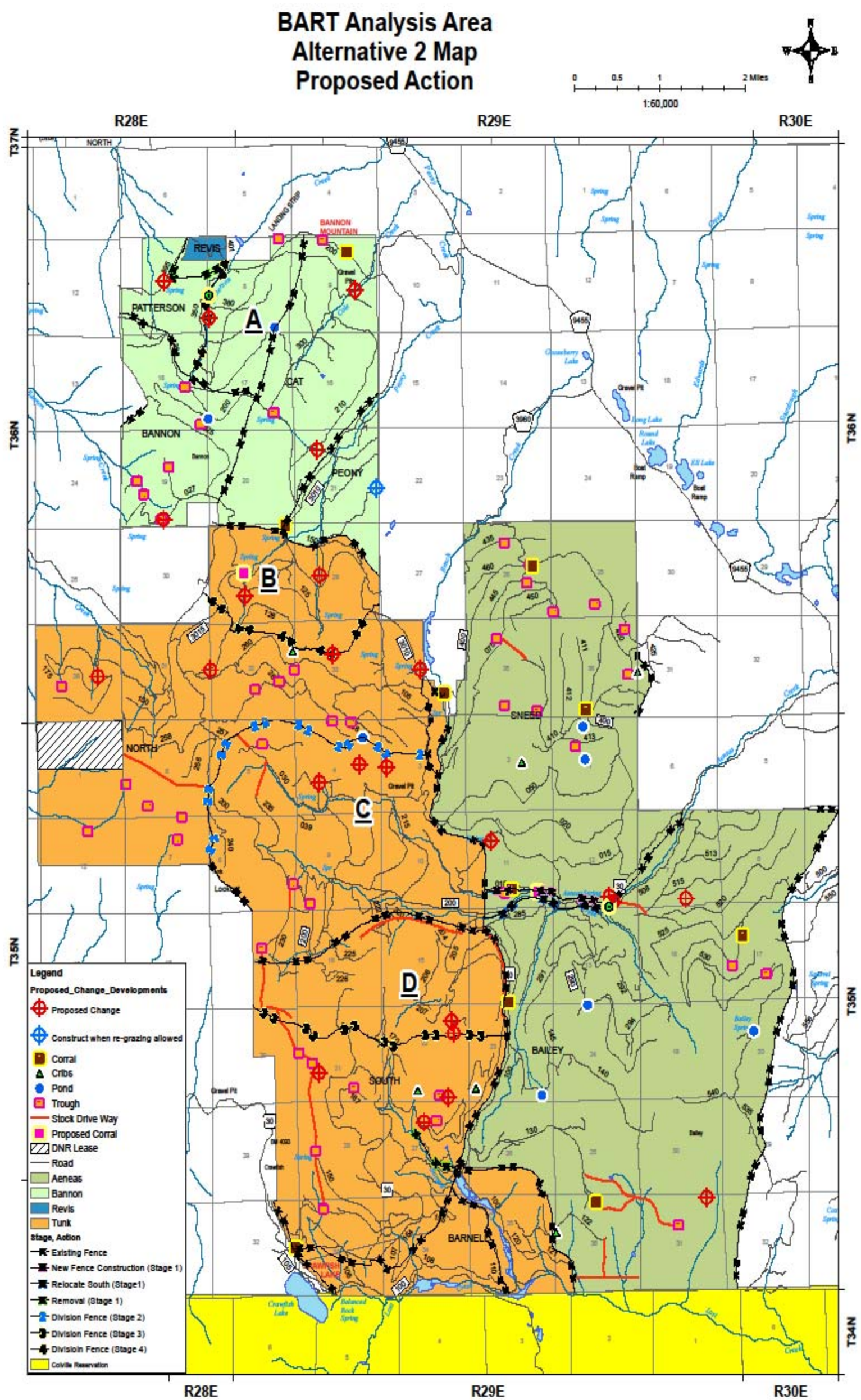


Figure S -3, Alternative 2

BART Analysis Area Alternative 3 Map

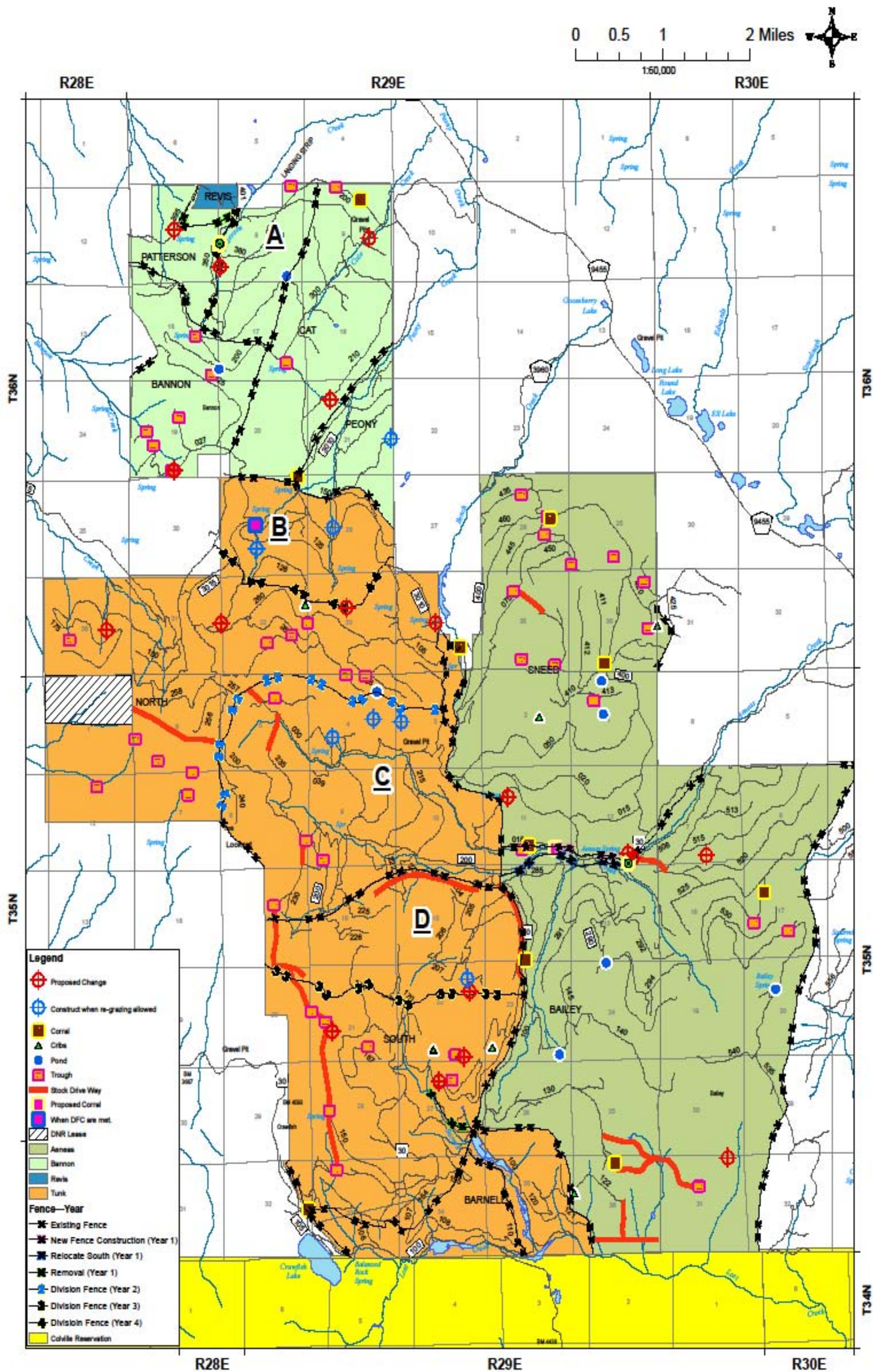


Figure S - 4, Alternative 3

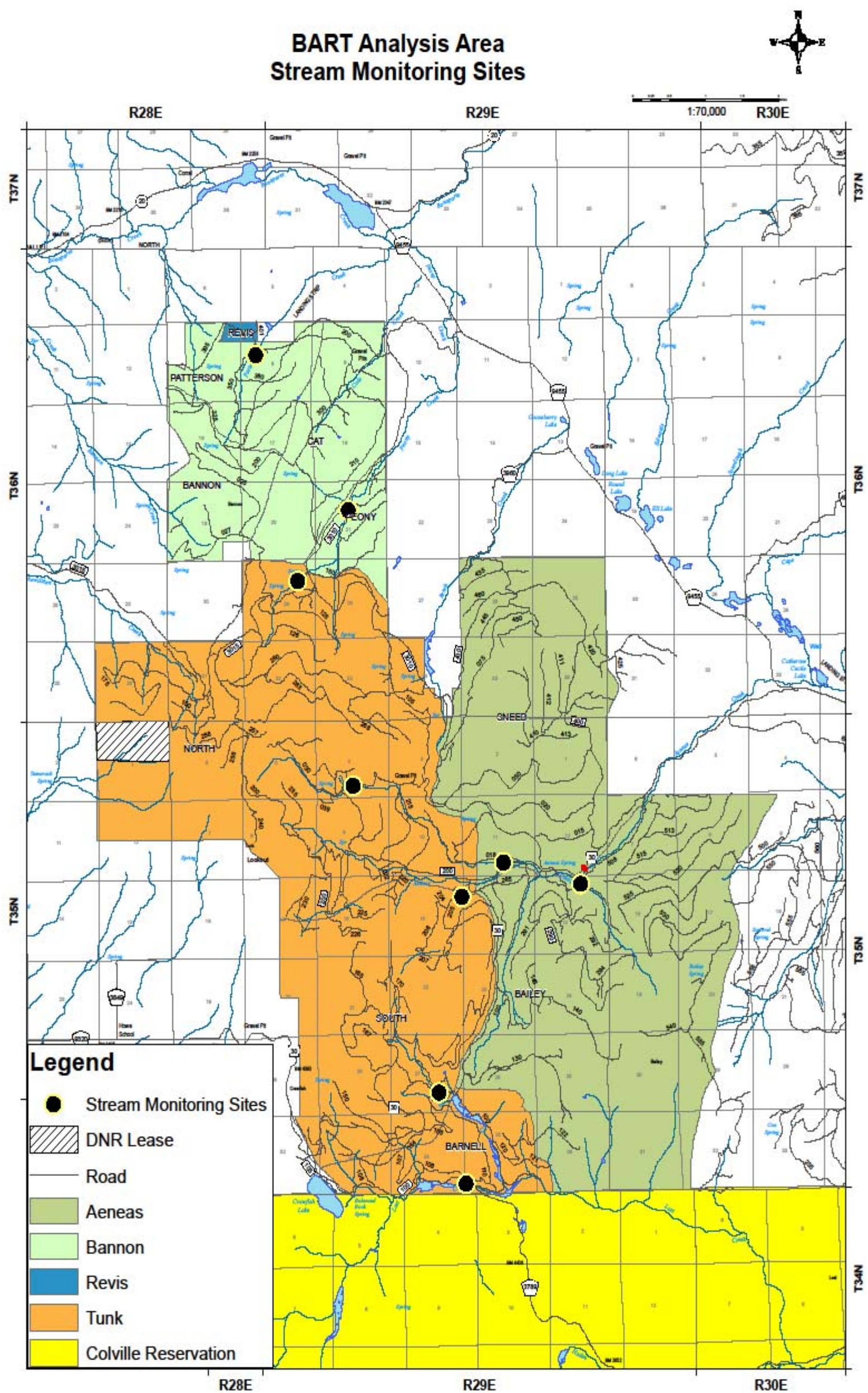


Figure S-5, Stream Monitoring Sites